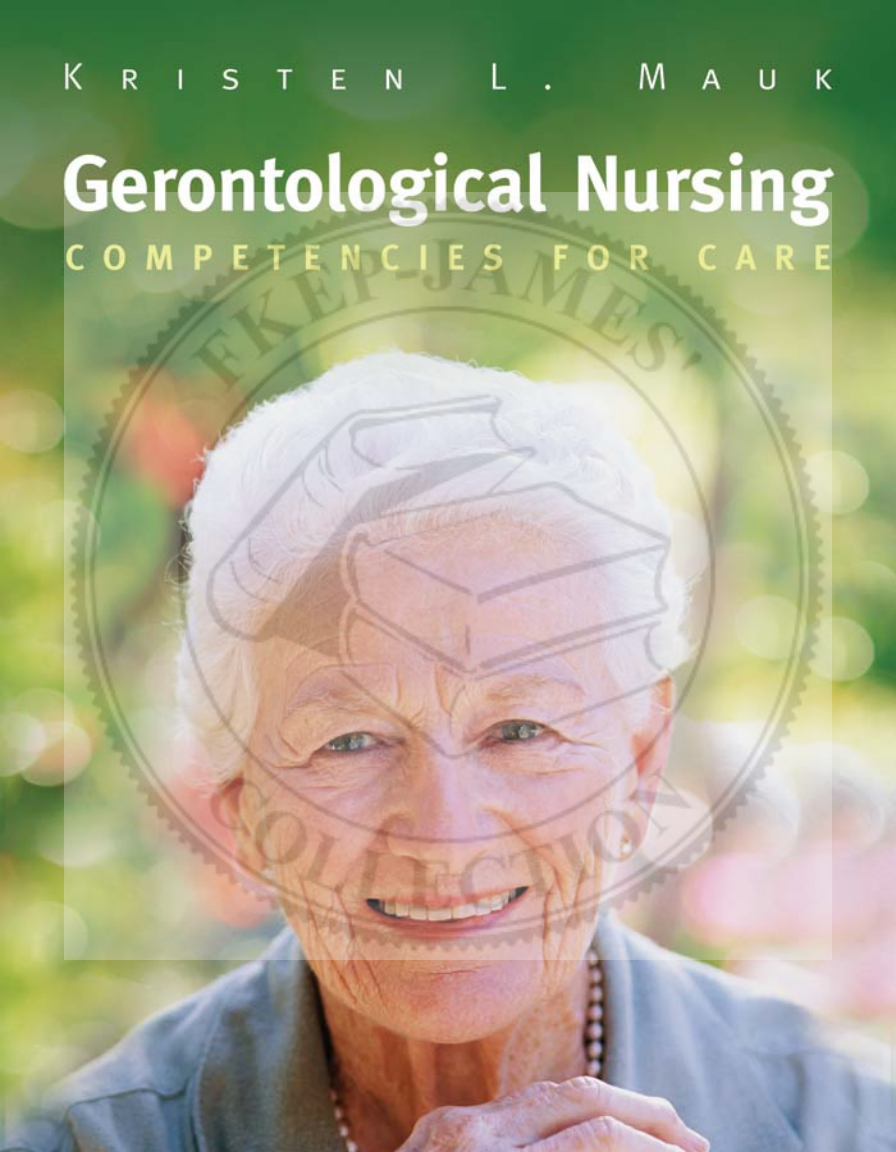
KRISTEN L. MAUK

Gerontological Nursing

COMPETENCIES FOR CARE



Gerontological Nursing

COMPETENCIES FOR CARE

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To the memory of my grandparents, Donald and Marion Gibson, from whom I learned to love the elderly and to value the amazing gifts that older adults bring to all of us.

KLM

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Foreword

Over the past 10 years, baccalaureate nursing education has made a serious commitment to assuring a nurse workforce prepared to care for older adults. With the overwhelming majority of patients in hospitals, home care, and nursing homes made up of people 65 and over, care of older adults is now the core business of our health care system. Yet, in 1997, fewer than one third of baccalaureate nursing programs had a stand-alone course in geriatrics, and of these, only 61% were required courses. Most programs indicated that they integrated geriatrics into the curriculum, but the degree of integration in most courses was quite limited (Rosenfeld et al., 1999).

In 2000, the American Association of Colleges of Nursing (AACN) took a major step to assure the infusion of gerontological nursing into the curriculum of baccalaureate nursing programs. In collaboration with the John A. Hartford Foundation Institute for Geriatric Nursing at New York University, AACN developed the document *Older Adults: Recommended Baccalaureate Competencies and Curricular Guidelines for Geriatric Nursing Care.* Developed to parallel AACN's earlier document, *The Essentials of Baccalaureate Education for Professional Nursing Practice* (1998), the geriatric competencies provide baccalaureate nursing programs with a framework of how to structure curricula in order to assure graduate competencies in the care of older adults.

Gerontological Nursing: Competencies for Care takes the AACN gerontological competencies to the next logical step by providing faculty with a text and online instructor's resources to foster curricular implementation. Such a text is critical because in most baccalaureate programs there is at best only one faculty member prepared in gerontological nursing. Thus, the unique approach adopted by this text can help gerontological nursing faculty transmit essential information to other faculty, thus helping to imbed the gerontological competencies throughout the curriculum. It also provides the structure for curriculum development and course content for those schools seeking to create free-standing required or elective courses in gerontological nursing.

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Preface

Although there are numerous gerontological nursing texts on the market today, this book is unique in that it is based on an essential document from the American Association of Colleges of Nursing (AACN) and the John A. Hartford Foundation Institute for Geriatric Nursing titled *Older Adults: Recommended Baccalaureate Competencies and Curricular Guidelines for Geriatric Nursing Care.* This book is intended to be a basic baccalaureate-level gerontological nursing text, and it is structured to ensure that students will attain the recommended competencies and knowledge necessary to provide excellent care to older adults. It can be used for a stand-alone course or in sections to be integrated throughout a nursing curriculum.

Using the recommended competencies as a guide, each chapter is written to assist students of gerontological nursing to acquire the essential knowledge and skills to provide excellent care for older adults. Competencies as set forth in the AACN/Hartford document are listed at the beginning of each chapter to help direct students' learning.

There are several outstanding features of the proposed text. First, the framework, as described above, is unique. In addition, the text is an edited work with a diverse authorship of over 30 contributors who represent all areas of gerontological nursing, including management, education, quality assurance, clinical practice in a variety of settings, advanced practice roles, research, business, consulting, and academia. Interdisciplinary collaboration on several chapters involved those with backgrounds in psychology, social work, pastoral care, pharmacy, gerontology, rehabilitation, and business management. The book also includes a unique chapter on future trends in gerontology. The text has a user-friendly and comprehensive format with the following pedagogical features:

- Learning objectives
- Key concepts
- Tables
- Boxes
- Pictures/diagrams/drawings
- Research highlights
- Critical thinking exercises

- Personal reflection exercises
- Case studies with questions
- Resource lists
- References (including Web sites)
- Recommended readings
- Glossary

Students will be delighted to have a glossary for each chapter as well as definitions of key terms within the text. The competencies recommended by AACN/Hartford Foundation are threaded throughout the book.

Instructors will find the accompanying online instructor's resources to be helpful time-saving tools. They include suggested activities for learning and in-class exercises, examination questions in a variety of formats, and PowerPoint slides for lectures that coincide with student readings in the main text.

This book is divided into sections that directly follow the AACN/Hartford Foundation's *Recommended Baccalaureate Competencies and Curricular Guidelines for Geriatric Nursing Care**. The thirty competencies shown here are those necessary to provide high-quality care to older adults and their families:

1. Recognize one's own and others' attitudes, values, and expectations about aging and their impact on care of older adults and their families. *(Section 1)*
2. Adopt the concept of individualized care as the standard of practice with older adults. *(Section 1)*
3. Communicate effectively, respectfully, and compassionately with older adults and their families. *(Section 2)*
4. Recognize that sensation and perception in older adults are mediated by functional, physical, cognitive, psychological, and social changes common in old age. *(Section 2)*
5. Incorporate into daily practice valid and reliable tools to assess the functional, physical, cognitive, psychological, social, and spiritual status of older adults. *(Section 3)*
6. Assess older adults' living environment with special awareness of the functional, physical, cognitive, psychological, and social changes common in old age. *(Section 3)*
7. Analyze the effectiveness of community resources in assisting older adults and their families to retain personal goals, maximize function, maintain independence, and live in the least restrictive environment. *(Section 3)*
8. Assess family knowledge of skills necessary to deliver care to older adults. *(Section 3)*
9. Adapt technical skills to meet the functional, physical, cognitive, psychological, social, and endurance capacities of older adults. *(Section 3)*
10. Individualize care and prevent morbidity and mortality associated with the use of physical and chemical restraints in older adults. *(Section 3)*
11. Prevent or reduce common risk factors that contribute to functional decline, impaired quality of life, and excess disability in older adults. *(Section 4)*

12. Establish and follow standards of care to recognize and report elder mistreatment. *(Section 4)*
13. Apply evidence-based standards to screen, immunize, and promote healthy activities in older adults. *(Section 4)*
14. Recognize and manage geriatric syndromes common to older adults. *(Section 5)*
15. Recognize the complex interaction of acute and chronic co-morbid conditions common to older adults. *(Section 5)*
16. Use technology to enhance older adults' function, independence, and safety. *(Section 6)*
17. Facilitate communication as older adults transition across and between home, hospital, and nursing home with a particular focus on the use of technology. *(Section 6)*
18. Assist older adults, families, and caregivers to understand and balance "everyday" autonomy and safety decisions. *(Section 7)*
19. Apply ethical and legal principles to the complex issues that arise in care of older adults. *(Section 7)*
20. Appreciate the influence of attitudes, roles, language, culture, race, religion, gender, and lifestyle on how families and assistive personnel provide long-term care to older adults. *(Section 8)*
21. Evaluate differing international models of geriatric care. *(Section 9)*
22. Analyze the impact of an aging society of the health care system. *(Section 9)*
23. Evaluate the influence of payer systems on access, availability, and affordability of health care for older adults. *(Section 9)*
24. Contrast the opportunities and constraints of supportive living arrangements on the function and independence of older adults and on their families. *(Section 9)*
25. Recognize the benefits of interdisciplinary team participation in care of older adults. *(Section 10)*
26. Evaluate the utility of complementary and integrative health care practices on health promotion and symptom management for older adults. *(Section 10)*
27. Facilitate older adults' active participation in all aspects of their own health care. *(Section 11)*
28. Involve, educate, and when appropriate, supervise family, friends, and assistive personnel in implementing best practices for older adults. *(Section 11)*
29. Ensure quality of care commensurate with older adults' vulnerability and frequency and intensity of care needs. *(Section 11)*
30. Promote the desirability of quality end-of-life care for older adults, including pain and symptom management, as essential, desirable, and integral components of nursing practice. *(Section 12)*

*From the AACN/Hartford Foundation Institute. (2000). *Recommended Baccalaureate Competencies and Curricular Guidelines for Geriatric Nursing Care.* New York, NY.

By using this text and online instructor's resources as a curricular guide, educators should be able to ensure that nursing students will meet the essential competencies that are recommended for excellent care of older adults.

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Unit One

Core Knowledge

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Section 1

Critical Thinking (Competencies 1, 2)

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Chapter 1

Introduction to Gerontological Nursing

Kristen L. Mauk, PhD, RN, CRRN-A, APRN, BC

LEARNING OBJECTIVES

At the end of this chapter, the reader will be able to:

1. Define several important terms related to nursing and the aging process.
2. Identify several subfields of gerontology.
3. Recognize factors in the development of attitudes towards aging and the aged.
4. Acknowledge his or her own attitudes and beliefs about the aging process and care of older adults.
5. Describe the roles of the gerontological nurse.
6. Discuss the scope of practice in gerontological nursing.
7. Relate the ANA standards for gerontological nursing to quality of care for older adults.
8. Describe core competencies in geriatric nursing.
9. Compare various settings in which nurses care for older adults.

KEY TERMS

- Activities of daily living (ADLs)
- Ageism
- Assisted living
- Certification
- Core competencies
- Financial gerontology
- Geriatrics
- Gerontological nursing
- Gerontological rehabilitation nursing
- Gerontology
- Geropharmaceutics
- Geropsychology
- Hospice
- Independent living
- Instrumental activities of daily living (IADLs)
- Intermediate care
- Middle old

- Old old
- Rehabilitation
- Skilled care
- Social gerontology
- Standards of gerontological nursing practice
- Subacute care
- Unlicensed assistive personnel (UAP)
- Young old

Introduction to Gerontological Nursing

As a nursing student, you may have preconceived ideas about caring for older adults. Such ideas are influenced by your observations of family members, friends, neighbors, the media, and your own experience with the elderly. Perhaps you have a close relationship with your grandparents or you have noticed the aging of your own parents. For some of you, the aging process may have become noticeable when you look at yourself in the mirror. But for all of us, this universal phenomenon we call aging has some type of meaning, whether or not we have taken the time to consciously think about it.

If you pictured yourself at the age of 85, what would you look like? What sights and sounds would be around you? Where would you be living? What activities would you be engaged in? This picture of yourself as an older person may be positive or negative. The way that you view aging and the elderly is often a product of your own environment and the experiences to which you have been exposed. Negative attitudes towards aging or the elderly (**ageism**) often arise in the same way—from negative past experiences. Many of our attitudes and ideas about older adults may not be grounded in fact. Some of you may have already been exposed to ageism, which is often displayed much in the way that sexism or racism is in people's attitudes and actions towards older people. This is yet another reason for studying the aging process—to take a look the myths and realities, to separate fact from fiction, and to gain a value for the wisdom of lifetimes that older adults have to offer.

As you will see, the majority of you in your careers as nurses will be caring for older adults at some point. Population statistics make that an irrefutable fact. Because the elderly have unique life situations and deal with physical changes as they age, it is essential that nurses be prepared to provide quality of care to this group of individuals. Mathy Mezey, Director of the Hartford Foundation at NYU, stated it thus: "The population of older Americans is exploding. Geriatric patients are not one sub-group of patients but rather the core business of health systems" (GeronurseOnline, 2005).

As you read and study this book, you are encouraged to examine your own thoughts, values, feelings, and attitudes about aging and the elderly. Perhaps you already have a positive attitude towards caring for the elderly. Build on that, and consider devoting your time and efforts to the field of gerontological nursing. If, however, you are reading this chapter today with the idea that geriatrics is a less desirable field

of nursing, that only those nurses who cannot find jobs elsewhere work in nursing homes, or that working with older people is the last choice you would ever make, then you need to re-examine these feelings. Armed with the facts and some positive experiences with older adults, you may just change your mind.

The older population is changing dramatically, and as the baby boomers (those born from 1946–1964) enter the older age group and gain retirement age (as of 2008), the world will drastically change. This phenomenon is happening in many other places around the globe as well as in the United States (see Chapters 2 and 23). Gerontology is the place to be! Caring for such a huge population of older adults will present enormous opportunities. With the over-85 age group being the fastest growing, the complexity of caring for so many people with multiple physical and psychosocial changes will present a challenge for the most daring of nurses. Will you be ready?

The purpose of this book is to provide the essential information needed by students of gerontological nursing to provide quality care to older adults. In your study of this text, you will be presented with knowledge and insights from experienced professionals with expertise in various areas of geriatrics. There are thought-provoking activities and questions for personal reflection in each chapter. Case studies will help you to think about and apply the information. A glossary is included at the end of the chapter to help you master key terms, and plenty of tables and figures summarize key information. Web sites are included as a means of expanding your knowledge. Use this text as a guidebook for your study. Use all of your resources at hand, including your instructors, to immerse yourself in the study of the aging process. In doing so, by the end of this book you will have gained the essential competencies to provide excellent care to older adults.

Definitions

Gerontology is the broad term used to define the study of aging and/or the aged. This includes the biopsychosocial aspects of aging. Under the umbrella of gerontology are several subfields including geriatrics, social gerontology, geropsychology, geropharmaceutics, financial gerontology, gerontological nursing, and gerontological rehabilitation nursing, to name a few.

What is old and who defines old age? Interestingly, although "old" is often defined as over 65 years of age, this is a rather arbitrary number set by the Social Security Administration. Today, the older age group is often divided into the **young old** (ages 65–74), the **middle old** (ages 75–84), and the **old old**, very old, or frail elderly (ages 85 and up). However, it is obvious that these numbers provide merely a guideline and do not actually or clearly define a true picture of the various strata of the aging population. Differences certainly exist between biological aging and chronological aging, and between the physical and emotional or social aspects of aging with each individual. How and at what rate persons age depend upon a host of factors that will be discussed throughout this book. The aging population and concepts related to aging are discussed further in Chapters 2 and 3.

Geriatrics is often used as a generic term relating to the aged, but specifically refers to medical care of the aged. This is why many nursing journals and texts have chosen to use the term *gerontological nursing* versus *geriatric nursing*.

Social gerontology is concerned mainly with the social aspects of aging versus the bio-

Case Study 1-1

Rose is a 52-year-old nursing student who has returned to school for her BSN after raising a family. She is the divorced mother of two grown children and one young grandson. In addition to being a full-time student in an accelerated program, Rose also cares for her 85-year-old mother in her own home and occasionally helps provide childcare for her grandson while his parents work. Rose's mother has diabetes and is legally blind. Rose is taking a gerontology course this semester and finds herself going home quite upset after the first week of classes when attitudes towards aging were discussed. While sharing with the course instructor her feelings and surprising emotional discomfort, Rose is helped to identify that she is afraid of getting older and being unable to care for her ailing mother and herself. As a single woman, she is unsure that she can handle what lies ahead for her as she is beginning to feel the effects of aging herself.

Questions:

1. What can Rose do to become more comfortable with facing her own advancing age?
2. What factors may have influenced her discomfort with the course material?
3. Is there anything the instructor of the course might do to help Rose cope with the feelings she is having as she completes the required course work?
4. There may be some activities that Rose can do in order to understand her feelings about aging better. Can you think of some such activities?
5. What is Rose's role as the caregiver in this situation? How may the role change over time?
6. How much does Rose's present home and living situation contribute to her fears and perceptions of aging?

logical or psychological. "Social gerontologists not only draw on research from all the social sciences—sociology, psychology, economics, and political science—they also seek to understand how the biological processes of aging influence the social aspects of aging" (Quadagno, 2005, p. 4). **Geropsychology** refers to specialists in psychiatry whose knowledge, expertise, and practice are with the older population. **Geropharmaceutics**, also called geropharmacology, is a unique branch in which pharmacists obtain special training in geriatrics. The credential for a pharmacist certified in geropharmaceutics is CGP (certified geriatric pharmacist).

Financial gerontology is another emerging subfield that combines knowledge of financial

planning and services with a special expertise in the needs of older adults. Cutler (2004) defines financial gerontology as "the intellectual intersection of two fields, gerontology and finance, each of which has practitioner and academic components" (p. 29). This relatively new field is further discussed in Chapter 23.

Gerontological rehabilitation nursing combines expertise in gerontological nursing with rehabilitation concepts and practice. Nurses working in gerontological rehabilitation often care for the elderly with chronic illnesses and long-term functional limitations such as stroke, head injury, multiple sclerosis, Parkinson's and other neurological diseases, spinal cord injury, arthritis, joint replacements, and amputations. The purpose of gerontological rehabilitation nursing is to assist older adults with such health deviations to regain and maintain the highest level of function and independence possible while preventing complications and enhancing quality of life.

Gerontological nursing, then, is the aspect of gerontology that falls within the discipline of nursing and the scope of nursing practice. It involves nurses advocating for the health of older persons at all levels of prevention. Gerontological nurses work with healthy elderly persons in their communities, the acutely ill elderly requiring hospitalization and treatment, and the chronically ill or disabled elderly in long-term care facilities, skilled care, home care, and hospice. The scope of practice for gerontological nursing includes all older adults from the time of "old age" until death.

The specialty of gerontological nursing was first formally recognized in the early 1970s, when the *Standards for Geriatric Practice* (1970) and the *Journal of Gerontological Nursing* (1975) were first published (Eliopoulos, 2005). Gerontological nursing is guided by standards of practice that will be discussed later in this chapter. Several roles of the gerontological nurse will be discussed in the following sections.

Roles of the Gerontological Nurse

Provider of Care

In the role of caregiver or provider of care, the gerontological nurse gives direct, hands-on care to older adults in a variety of settings. Older adults often present with atypical symptoms that complicate diagnosis and treatment. Thus, the nurse as a care provider should be educated about the common disease processes seen in the older population. This includes knowledge of the backgrounds and statistics, risk factors, signs and symptoms, usual medical treatment, nursing care through evidence-based practice, and rehabilitation if applicable. Chapters 11 and 12 cover many such common problems seen in the elderly, imparting essential information for providing quality care.

Teacher

An essential part of all nursing is teaching. Gerontological nurses focus their teaching on modifiable risk factors. Many diseases of aging can be prevented through lifestyle modifications such as a healthy diet, smoking cessation, appropriate weight maintenance, increased physical activity, and stress management. Nurses have a responsibility to educate the older adult population about ways to decrease the risk of certain disorders such as heart disease, cancer, and stroke, the leading causes of death for this group. Nurses also may develop expertise in specialized

areas and teach skills to other nurses in order to promote quality patient care among older adults.

Manager

Gerontological nurses act as managers during everyday care as they balance the concerns of the patient, family, nursing, and the rest of the interdisciplinary team. Nurse managers need to develop skills in staff coordination, time management, assertiveness, communication, and organization. Nurse managers may supervise other nursing personnel including licensed practical nurses (LPNs), certified nursing assistants (CNAs), nurse technicians, nursing students, and other **unlicensed assistive personnel** (UAP) (see **Case Study 1-2**). The role of the gerontological nurse as manager is further discussed in Chapter 21.

Case Study 1-2

Jerry is a new BSN graduate who has been hired as a charge nurse on the skilled care unit in a nursing home. The unit that Jerry is in charge of has 44 residents and employs a mixture of full- and part-time staff: 1 RN, 5 LPNs, and 15 UAP, mainly nursing assistants. Jerry has noted in her first days on the job that there is low morale on the unit and that patient care seems to be suffering. She has identified that there is a lack of understanding about the aging process and some negative attitudes toward the residents on the part of some of the staff members.

Questions:

1. What steps should Jerry take to address the problems she has identified on her unit?
2. Is this a realistic position for Jerry to have as a first job? Why or why not?
3. What preparation should Jerry have had in her basic nursing program that would be of help in managing this unit?
4. What are the first types of staff education programs that Jerry should present or have presented to the staff?
5. What dialogue needs to be initiated between staff and management? Between nurses and nursing assistants? Between full- and part-time employees?
6. Where might the staff with negative attitudes have been influenced in their perceptions?
7. How will changes that Jerry could institute impact the quality of patient care?

Case Study 1-3

The Brokowskis are a close-knit family of five whose grandfather, Papa B., has been living with them in their home since he was widowed 10 years prior. Papa B. is 88 years old and has recently been diagnosed with Alzheimer's disease in the early stage. The family is having increasing difficulty supervising Papa B. and feels it is no longer safe for him to be at home alone. Both parents in the family work, and the three children are in high school during the day. The family wishes to keep Papa B. at home, but do not know what possibilities there are in the community to help them.

Questions:

1. What services might the Brokowski family use to help them keep Papa B. at home? Do these services seem feasible at this time?
2. As Papa B.'s condition worsens with the progression of Alzheimer's disease, what other services discussed in this chapter might be necessary at various points in time?
3. What assessments would a nurse need to make in order to determine the best placement for Papa B.? Given the history of this family, what recommendations for the future might be made? Which interdisciplinary team member could provide additional information to the nurse and the family about community services?

Advocate

As an advocate, the gerontological nurse acts on behalf of older adults to promote their best interests and strengthen their autonomy and decision making. Advocacy may take many forms, including active involvement at the political level or helping to explain medical or nursing procedures to family members on a unit level. Nurses may also advocate for patients through other activities such as helping family members choose the best nursing home for their loved one or listening to family members vent their frustrations about health problems encountered. Whatever the situation, gerontological nurses remember that being an advocate does not mean making decisions for older adults, but empowering them, helping them remain independent and retain dignity, even in difficult situations.

Research Consumer

The appropriate level of involvement for nurses at the baccalaureate level is that of research consumer. This involves gerontological nurses being aware of current research literature, continuing to read and put into practice the results of reliable and valid studies. Using evidence-based

practice, gerontological nurses can improve the quality of patient care in all settings. Although nurses with undergraduate degrees are more heavily involved in research in some facilities, their basic preparation is most aimed at the research usage level. However, many BSN nurses help on research teams with data collection and by providing research ideas based on problems encountered in the clinical setting. All nurses should read the journals specific to their specialty and continue their education by attending seminars and workshops, pursuing additional formal education or degrees, or obtaining certification. Any of these activities promote the role of the nurse as research consumer.

Expanded roles of the gerontological nurse may also include counselor, case manager, coordinator of services, collaborator, geriatric care manager, and others. Several of these roles are discussed in other chapters (Sections 13 and 14).

Basic Certification

Nurses often wonder about the benefits of certification. Certification in a specialty demonstrates expertise in that area and is often a coveted credential for employment at magnet facilities. Even though more than half of patients in acute care hospitals are over 65, less than 1% of all registered nurses are certified in gerontology (GeronurseOnline, 2005). This makes certification a valuable commodity.

Some nurses argue that certification is not needed to demonstrate expertise, and that may be true. However, nurses who aspire to become leaders and mentors in the field of geriatrics help to build the specialty by demonstrating mastery of content through examination and accountability of continued education in this field of expertise.

Two certifications are available at the professional nurse level from the American Nurses Credentialing Center (ANCC). The associate degree/diploma-level certification carries the credential RN, C (Registered Nurse, Certified) and the baccalaureate-level certification carries the credential RN, BC (Registered Nurse, Board Certified). **Table 1-1** displays the test content outline for these exams.

For both exams, the basic eligibility requirements for candidates include: 1) 2 years of full-time practice as an RN in the United States or the equivalent thereof, 2) a minimum of 2,000 hours of clinical practice in gerontological nursing within the last 3 years, and 3) 30 or more continuing education contact hours in gerontological nursing within the last 3 years. The ANCC Web site (http://www.nursecredentialing.org/certification/index.html) provides more information about obtaining and maintaining certification in gerontological nursing.

Roles of the Advanced Practice Nurse (APN)

Advanced practice in gerontological nursing generally falls within two aspects of the APN role: gerontological clinical nurse specialist and geriatric nurse practitioner. Both specialists hold a minimum of a master's degree in nursing and have passed an examination to obtain credentialing in the specialty, if certified. Although many family nurse practitioners (FNPs) treat older clients or patients and develop an expertise in geriatrics, their education and certification is not as specific to the older adult as gerontological nurse practitioners (GNPs).

The gerontological clinical nurse specialist focuses on education of patients, families, and

Table 1-1 Overview of Test Content Outline

I. Primary Care Consideration
   A. The aging population
   B. Theories
   C. Communication process
   D. Death and dying

II. Major Health Problems
   A. Cardiovascular problems
   B. Respiratory problems
   C. Gastrointestinal problems
   D. Urinary and reproductive problems
   E. Hematological problems
   F. Musculoskeletal problems
   G. Metabolic and endocrine problems
   H. Immunologic problems
   I. Neurological problems
   J. Psychiatric and psychosocial problems
   K. Integumentary problems
   L. Sensory problems
   M. Medications
   N. Pain

III. Organizational and Health Policy Issues
   A. Health care delivery systems
   B. Federal regulation
   C. Reimbursement mechanisms

IV. Professional Issues
   A. Scope and standards of practice
   B. Leadership and management
   C. Research
   D. Ethical and legal issues
   E. Gerontological nursing trends and issues

Source: American Association of College of Nursing (2005). Overview of Test Content Outline. Retrieved from the World Wide Web at www.nursecredentialing.org.

staff and often works in collaborative practice with physicians or hospitals. The gerontological clinical nurse specialist is often an academic educator, consultant, or entrepreneur. In many states, geriatric clinical nurse specialists (CNSs) may obtain prescriptive authority and broaden the scope of practice. Many CNSs have designed and managed clinics for common conditions in the older population, such as urinary incontinence, wounds, and arthritis. The ANCC described the role of the gerontological CNS thus:

Box 1-1 Suggested Web Sites

Educational Web Sites:

www.gerontologicalnursing.info
www.geronurseonline.com
www.nursingworld.org/ancc/certification

Associations:

Administration on Aging
www.aoa.dhhs.gov
American Geriatrics Society
www.americangeriatrics.org
American Nurses Credentialing Center
www.nursecredentialing.org/certification
Gerontological Society of America
www.geron.org
John A. Hartford Foundation
www.hartfordign.org
Hospice and Palliative Care Nurse Association (HPNA)
www.hpna.org
National Adult Day Services Association
www.nadsa.org
National Association of Geriatric Nursing Assistants
www.nagna.org
National Association of Professional Geriatric Care Managers
www.caremanager.org
National Council on the Aging
www.nic.ncoa.org
National Gerontological Nursing Association
www.ngna.org
National Institute on Aging
www.nia.nih.gov

The Clinical Nurse Specialist in Gerontological Nursing is an expert in providing, directing, and influencing the care of older adults and their families and significant others in a variety of settings. This nurse specialist has an in-depth understanding of the dynamics of aging, as well as the intervention skills necessary for health promotion and management of health status alterations. The Clinical Nurse Specialist provides comprehensive gerontological nursing services independently or collaboratively with multidisciplinary teams. The CNS advances the health care of older adults and the specialty of gerontological nursing through theory and research. The CNS is engaged in practice, case management, education, consultation, research, and administration. (ANCC, 2005a, p. 1)

The GNP is found more often in acute care settings or in collaborative practice with physicians who maintain offices that service a large older population.

The Gerontological Nurse Practitioner (GNP) is an expert in providing health care to older adults in a variety of settings, practicing independently and collaboratively with other health care professionals. In this role, the GNP works to maximize patients' functional abilities. Specifically the GNP promotes, maintains, and restores health, prevents or minimizes disabilities, and promotes death with dignity. The GNP engages in advanced practice, case management, education, consultation, research, administration, and advocacy for older adults. (ANCC, 2005)

Part of the GNP role may be making regular visits to nursing homes where patients in his or her collaborative practice reside. More recently,

Box 1-2 Additional Resources

American Nurses Credentialing Center (ANCC)
P.O. Box 791333
Baltimore, MD 21279-1333
202-651-7000
800-284-2378
www.nursecredentialing.com

John A. Hartford Foundation
55 East 59th Street
16th Floor
New York, NY 10022-1178
212-832-7788
Email: mail@jhartfound.org
www.hartfordign.org
www.jhartfound.org

Geriatric Nursing Review Syllabus: A Core Curriculum in Advanced Practice Geriatric Nursing (GNRS) (2003–2005)
Available from the American Geriatrics Society
1-800-334-1429 ext. 2529

GNPs are carving out a niche in rehabilitation facilities, working in outpatient clinics for rehabilitation patients after discharge or with specialty physicians, managing caseloads, and diagnosing and treating uncomplicated conditions in collaboration with a physician.

Clinician

Advanced Practice Nurses (APNs) who practice in gerontology should be expert clinicians in the field. As GNPs, clinical hours during master's work or postmaster's certification are done with older adults. GNPs also collaborate with physicians who care for a majority of older patients, whether in clinical settings or nursing homes. The gerontological CNS is also an expert clinician, but with less emphasis on diagnosis and treatment in primary care settings and more on other aspects of care across all levels of prevention, usually dealing with older adults with tertiary problems.

Educator

Nurses in advanced practice will engage in education of patients, clients, staff, and other interdisciplinary team members. The role of educator encompasses a variety of settings, from the community to acute care to tertiary care facilities. Additionally, many APNs work in academic institutions, teaching students in nursing colleges, or departments within universities.

Leader

As a leader, the APN actively engages in advocating for the health of older adults. This may include mentoring other nurses; acting as an intermediary for patients, family members, and other team members; or being politically active by working to change laws to advance the care of the elderly. Nurse leaders are often seen as pioneers in research, administration, politics, law, and practice. Most nurse leaders are widely published. The role of leader is further discussed in Chapter 21.

Researcher

At the advanced practice level, nurses act as expert consultants and clinicians in research projects. APNs often pose the research questions that arise in practice and collaborate with doctorally prepared gerontological nurses to explore

areas of interest. Doctorally prepared nurses are educated to design, conduct, and analyze research. APNs and doctorally prepared faculty work together to obtain grant funding to carry out important research. This is often done with an interdisciplinary team when exploring topics in gerontology because many researchable problems cross various disciplines. APNs should also keep up to date on the latest research to be able to serve as a resource for other staff members about best practices in gerontology.

Consultant

One of the most unique roles of the APN is that of consultant. Nurses with advanced knowledge, education, and experience are in a special position to provide consulting services in many areas. This may include legal consulting, working with financial planners, or helping businesses with programming for the elderly. In addition, many APNs act as educational consultants for large businesses or for outreach programs in which they are paid to travel to a number of places presenting workshops and seminars for their employers. Other APNs are authors, speakers, and business owners.

Advanced Certification

The exams offered by the ANCC are different for the clinical specialist in gerontological nursing and the gerontological nurse practitioner. These computerized exams are offered at over 300 computer-based testing sites across the country 6 days per week, increasing the convenience of sitting for certification.

Requirements for certification as a clinical nurse specialist in gerontological nursing (APRN, BC) or as a gerontological nurse practitioner (GNP) include holding an unrestricted professional license, a master's degree or higher in nursing, formal training in the specialty area of application (i.e., a program or postgraduate certificate program), and graduation from an accredited program with a minimum of 500 hours of supervised clinical practice in the specialty (ANCC, 2005a). For the CNS designation, students may sit for the exam after graduation if their program contained 500 supervised hours in their field of study.

Standards of Practice

The ANA provides a publication on the scope and **standards of gerontological nursing practice**. The complete book of these standards may be ordered from the ANA bookstore online (www.nursingworld.org/books). These standards are developed by gerontological nurses and used by them to evaluate and guide practice. The standards for clinical gerontological nursing include assessment, diagnosis, outcome identification, planning, implementation, and evaluation (ANA, 2001). The standards of professional gerontological nursing performance include quality of care, performance appraisals, education, collegiality, ethics, collaboration, research, and research utilization. Students will note that these are the basic standards for professional nursing, but here they are applied in the care of the older adult. The core competencies discussed in the next section provide more specific guidelines for gerontological nursing care.

Core Competencies

The American Association of Colleges of Nursing (AACN) and the John A. Hartford Foundation sponsored the input of many qualified gerontological nursing experts to publish

Older Adults: Recommended Baccalaureate Competencies and Curricular Guidelines for Geriatric Nursing Care (2000). This document also provided the framework for this text. The **core competencies** set forth for gerontological nursing appear in **Table 1-2**. The purpose of this document specific to gerontological nursing was to use the AACN's *The Essentials of Baccalaureate Education for Professional Nursing Practice* (1998) as a framework to help nurse educators integrate specific nursing content into their programs. The original AACN document suggested core competencies, knowledge, and role development for professional nurses. These appear in **Table 1-3**. The geriatric competencies in Table 1-2 correlate with and were derived from the suggestions in the more general AACN document in Table 1-3. By using these published documents as guides, nursing professors and other who educate in the area of gerontological nursing should be able to prepare students to be competent to provide excellent care to older adults.

Settings of Care

Gerontological nurses practice in a multitude of settings. Adults over age 65 comprise 48% of patients seen in the hospital, 80% of home care patients, and 90% of those in nursing homes (GeronurseOnline.org, 2005). A few of these settings will be discussed here. Some additional unique areas of employment are suggested in Chapter 23.

Because of the nature of the aging process, it is likely that older adults will enter and exit the health care system at many different points throughout old age. **Figure 1-1** presents the web of health care that often occurs when older adults enter the system due to illness or accident.

Acute Care Hospital

The acute care hospital is often the point of entry to the health care system for older adults. Nurses working in hospitals are likely to care for older adults even if they do not specialize in geriatrics, because about half of all patients in this setting are older. In this setting, gerontological nurses focus on treatment and nursing care of acute problems such as those occurring from trauma, accidents, orthopedic injuries, respiratory ailments, or serious circulatory problems. Any unit (except for maybe labor/delivery/postpartum and pediatrics) in the acute care hospital may serve older adults, so nurses may work on units that are intensive or rehabilitative in nature, and anything in between. The purpose of care will be to assist with survival and prevent complications.

Long-Term Care

There are many different levels of care that fall under the long-term care umbrella. These may include **assisted living**, **intermediate care**, **skilled care**, and Alzheimer's units. Facilities that offer these services are generally called by one of several names: nursing homes, long-term care facilities (LTCFs), skilled nursing facilities (SNFs), retirement homes, assisted living facilities, or **rehabilitation** and health care villages (**Figure 1-2**). The places that offer these services may advertise just one or a multitude of levels of care. The majority of LTCFs today in the United States are for-profit or chain-run nursing homes. For this reason, they generally wish to keep their residents within their own system. This is accomplished by first providing **independent living** apartments, either within a separate unit or in different housing on the property. Older adults using this service generally care for them-

Table 1-2 Competencies Necessary for Nurses to Provide High-Quality Care to Older Adults and Their Families

1. Recognize one's own and others' attitudes, values, and expectations about aging and their impact on care of older adults and their families.
2. Adopt the concept of individualized care as the standard of practice with older adults.
3. Communicate effectively, respectfully, and compassionately with older adults and their families.
4. Recognize that sensation and perception in older adults are mediated by functional, physical, cognitive, psychological, and social changes common in old age.
5. Incorporate into daily practice valid and reliable tools to assess the functional, physical, cognitive, psychological, social, and spiritual status of older adults.
6. Assess older adults' living environment with special awareness of the functional, physical, cognitive, psychological, and social changes common in old age.
7. Analyze the effectiveness of community resources in assisting older adults and their families to retain personal goals, maximize function, maintain independence, and live in the least restrictive environment.
8. Assess family knowledge of skills necessary to deliver care to older adults.
9. Adapt technical skills to meet the functional, physical, cognitive, psychological, social, and endurance capacities of older adults.
10. Individualize care and prevent morbidity and mortality associated with the use of physical and chemical restraints in older adults.
11. Prevent or reduce common risk factors that contribute to functional decline, impaired quality of life, and excess disability in older adults.
12. Establish and follow standards of care to recognize and report elder mistreatment.
13. Apply evidence-based standards to screen, immunize, and promote healthy activities in older adults.
14. Recognize and manage geriatric syndromes common to older adults.
15. Recognize the complex interaction of acute and chronic co-morbid conditions common to older adults.
16. Use technology to enhance older adults' function, independence, and safety.
17. Facilitate communication as older adults transition across and between home, hospital, and nursing home, with a particular focus on the use of technology.
18. Assist older adults, families, and caregivers to understand and balance "everyday" autonomy and safety decisions.
19. Apply ethical and legal principles to the complex issues that arise in care of older adults.
20. Appreciate the influence of attitudes, roles, language, culture, race, religion, gender, and lifestyle on how families and assistive personnel provide long-term care to older adults.
21. Evaluate differing international models of geriatric care.
22. Analyze the impact of an aging society on the health care system.
23. Evaluate the influence of payer systems on access, availability, and affordability of health care for older adults.

(continues)

Table 1-2 Competencies Necessary for Nurses to Provide High-Quality Care to Older Adults and Their Families (continued)

24. Contrast the opportunities and constraints of a supportive living arrangement on the function and independence of older adults and on their families.
25. Recognize the benefits of interdisciplinary team participation in care of older adults.
26. Evaluate the utility of complementary and integrative health care practices on health promotion and symptom management for older adults.
27. Facilitate older adults' active participation in all aspects of their own health care.
28. Involve, educate, and when appropriate, supervise family, friends, and assistive personnel in implementing best practices for older adults.
29. Ensure quality of care commensurate with older adults' vulnerability and frequency and intensity of care needs.
30. Promote the desirability of quality end-of-life care for older adults, including pain and symptom management, as essential, desirable, and integral components of nursing practice.

Source: American Association of Colleges of Nursing and the John A. Hartford Institute for Geriatric Nursing. (2000). *Older Adults: Recommended Baccalaureate Competencies and Curricular Guidelines for Geriatric Nursing Care.* Washington, DC: Author.

selves, but may require someone to check on them daily. Meals are provided every day at a cost, of course, and monthly prices vary among facilities based on room size and extra services. Older adults pay out of pocket to live in independent living apartments or centers and the costs may range greatly, from around $1,800–$6,000 per month. Because these adults do not need regular nursing care, the opportunity for nurses in this level of care would consist of directing such a facility or perhaps acting as a wellness coordinator, though most independent living centers would not employ a nurse strictly for such purposes. Further information about independent living appears later in this chapter.

Assisted Living

As older persons continue to age, it is likely that common disorders associated with the aging process may interfere with their ability to care for themselves. Assisted living provides an alternative for those older adults who do not feel safe living alone, who wish to live in a community setting, or who need some additional help with **activities of daily living (ADLs)**. Assisted living is often connected with a facility or care network, generally those that provide long-term care, though the facility itself may be free-standing and cater exclusively to the assisted living population. The drawback of this arrangement is not only that older adults whose condition degenerates and who need greater assistance find a cost attached with each extra bit of help they need in assisted living, but also that they may be turned out of the facility when their care needs become greater, leaving them to find another institution that provides a higher level of care.

The typical resident in assisted living has a private room or apartment (with a variety of designs available for different costs). All rooms

Table 1-3 AACN ESSENTIALS (1998)

Core Competencies
Critical thinking
Communication
Assessment
Technical skills

Core Knowledge
Health promotion, risk reduction, and disease prevention
Illness and disease management
Information and health care technologies
Ethics
Human diversity
Global health care
Health care systems and policy

Role Development
Provider of care
Designer/manager/coordinator of care
Member of a profession

Source: American Association of Colleges of Nursing (1998). *Essentials of baccalaureate education for professional nursing practice.* Washington, DC: Author

will have some type of kitchen or kitchenette and private bathroom with shower. The rest of the space includes a bed or bedroom, living area, and sufficient closet space. Older adults who enter assisted living often sell their homes and plan to spend as long as possible living with minimal assistance.

Assisted living facilities generally provide healthy meals, planned activities, places to walk and exercise, and should offer pleasant surroundings where adults can socialize with others their own age in a safe and protected environment. Walking paths, aviaries, work-out rooms, beauty salons, community gathering rooms, chapels, and game rooms are part of many assisted living facilities.

Assisted living facilities may be free-standing or may be part of a larger facility that provides multiple levels of care. For those units that are part of the large facility, residents who find themselves in need of progressively greater assistance and around-the-clock nursing supervision may then enter intermediate care.

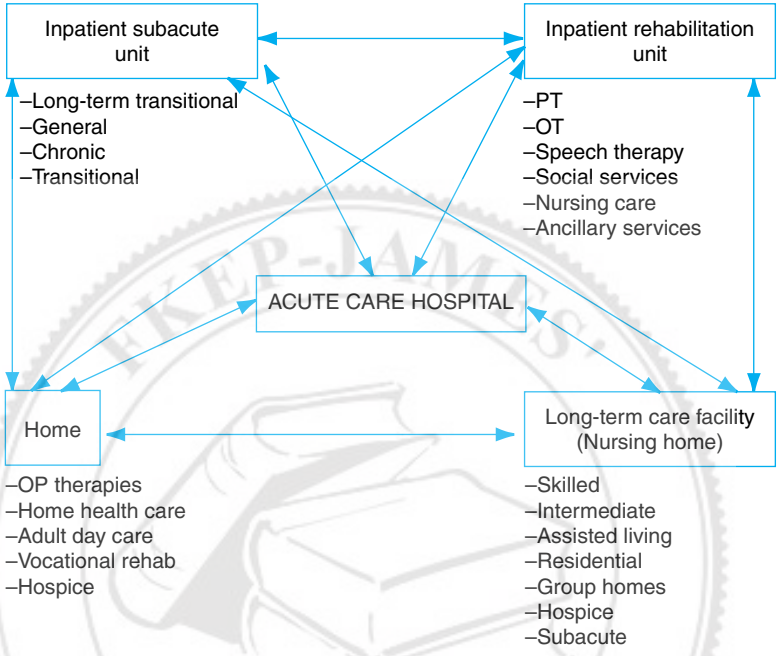
INTERMEDIATE CARE

This level of care provides 24-hour per day direct nursing contact and may be considered to be the entry level into nursing home care. Intermediate care units may be named differently depending upon the facility. Older persons are unable to live on their own because of a number of factors, including numerous medications to manage, mobility problems, or the presence of chronic diseases that require an amount of nursing supervision beyond what a person could manage independently (like diabetes, severe arthritis, multiple medications, or amputations complicated by mobility changes). Some units have residents with early Alzheimer's disease in this level of care. Of course, three meals a day are provided, usually in a common dining area, and a licensed nurse (LPN or RN) is in charge of the unit with several UAP to assist with ADLs. Therapies such as physical, occupational, and speech are available and provided as ordered by the physician. A certain number of beds may be Medicare or Medicaid (see Chapter 16) licensed, with the rest private pay. As the amount of care required increases, so does the daily or monthly cost.

SUBACUTE OR TRANSITIONAL CARE

Subacute care is generally for patients who require more intensive nursing care than the tra-

Figure 1-1 The "web" of health care for the elderly.



Source: Easton, K. L., 1999, *Gerontological Rehabilitation Nursing*, p. 14. Used with permission. Philadelphia: W. B. Saunders.

ditional nursing home can provide, but less than the acute care hospital. Frequent patient assessments are needed for a limited time period for stabilization or completion of a treatment regimen. "Typical individuals seen in subacute care are those needing assistance as a result of nonhealing wounds, chronic ventilator dependence, renal problems, intravenous therapy, and coma management and those with complex medical and/or rehabilitative needs, including pediatrics, orthopedics, and neurological. These units are designed to promote optimum outcomes in the least expensive cost setting" (Easton, 1999, p. 15). Subacute units may be found in LTCFs or hospitals. Gerontological nurses working in this setting would benefit from having a critical care background and rehabilitation experience as well.

Skilled Care

Skilled care units or skilled nursing facilities (SNFs) are for those older adults requiring more intensive nursing care. Some units are found within nursing homes, others within hospitals. On this unit, one would expect to see persons with tube feedings, IV fluids, multiple medications, chronic wounds, and even ventilators in some cases. The care required is at a higher level, and the higher acuity of the residents or patients demands a greater nurse-to-patient ratio. Persons in skilled care may include those with

Figure 1-2 Assisted-living facilities aid older people with activities of daily living.

Source: © Comstock Images/Alamy Images

severe stroke, dementia, head injury, coma, or advanced degenerative and/or neurological disorders. A certain number of skilled nursing beds are licensed by the state, and SNFs must meet more rigorous requirements than intermediate care. The gerontological nurse working in skilled care must have expertise in preventing the hazards of immobility such as pressure ulcers and contractures. The skilled care nurse should have knowledge of transfer techniques, prevention and assessment of swallowing problems, bowel and bladder management, and nutrition. Good assessment and communication skills are needed to care for these complex patients.

Alzheimer's Care

A growing trend in LTCFs today is to offer units dedicated to the major phases of Alzheimer's disease (AD). Because of the higher incidence of AD with advanced age, there is a growing need for units that provide nursing care for elders in the various stages of dementia that occur with Alzheimer's. Often, family members can care for their loved ones at home during the early stages. However, during middle and late stage AD, the older patient cannot be left alone and shows increasing signs of deterioration and inability to care for themselves. As memory loss progresses with AD, home caregivers often feel overwhelmed and unable to meet the care burden

required by these patients. Many nursing homes offer early, middle, and late AD care in order to keep these patients in the same system. As AD progresses, so does the level of care required. Alzheimer's units can be a great benefit to the community by having gerontological nursing staff that has expertise in the management of this difficult disease. Nurses can help family members understand disease progression and assure them that their loved one is being well cared for even to the end of the disease, which results in death. Having all levels of care at the same facility makes it easier for patients with AD who have a hard time with new surroundings, and easier for family members not to have to change facilities as the disease worsens.

Hospice

Gerontological nurses may also choose to work in **hospice**, caring for dying persons and their families. Although many patients in hospice are not elderly, the majority of the dying are older. The concept of hospice is centered around holistic, interdisciplinary care that helps the dying person "live until they die" (see Chapter 22 for further discussion). A number of team members who specialize in thanatology and palliative care work together to provide quality care for patients in their last months, weeks, days, and hours of life. Pain management and comfort care are the standards upon which treatment is based. Nurses and physicians work closely with social workers, chaplains, psychologists, and other hospice professionals to make death as comfortable and as easy a transition as possible.

Hospice may appear in a number of facilities. Some hospices are stand-alone organizations with their own building just dedicated to hospice care. Home care often offers hospice, and certain nursing homes will offer a hospice unit or care within the skilled unit or from an outside hospice nurse. Clinical nurse specialists provide a great service as expert clinicians and consultants to the hospice team. Whatever the setting, hospice requires a great deal of patience, expertise, understanding, interdisciplinary communication, and compassion skills on the part of the geriatric nurse.

Rehabilitation

Rehabilitation may be found in various degrees in several settings, including the acute care hospital, subacute or transitional care, and LTCFs. Regardless of the setting, rehabilitation is done through the work of an interdisciplinary team that includes nurses, therapists, and physicians as well as other professional staff as needed. The goals of rehabilitation are to maximize independence, promote maximal function, prevent complications, and promote quality of life within each person's strengths and limitations.

The level of intensity of acute rehabilitation is greater than for subacute or long-term care. For older adults to qualify for rehabilitation in the acute care hospital, they must be able to tolerate at least 3 hours of therapy per day. The interdisciplinary team will work together to set up mutually established goals with the patient. Inpatient rehabilitation in the acute setting is beneficial to help persons recovering from or adapting to such conditions as stroke, head trauma, neurological diseases, amputation, orthopedic surgery, and spinal cord injury.

Community

Many nursing programs are moving towards a more community-based curriculum. This is helpful for students of gerontological nursing, because most older adults live in the community, with only about 5% at any given time residing

in nursing homes (see Chapter 2 for more statistics on the aging population). However, remember that many encounters with older adults will be as they enter the health care system for illness, whether chronic or acute, so fewer job possibilities exist at present in primary and wellness-oriented settings. Within the community, one may find many different areas for practice, only a few of which will be discussed here.

Home Health Care

Older adults requiring a longer period of observation or care from nurses may be candidates for home health care services. Visiting nurse associations (VNAs) have long been known for their positive reputation in providing home care. Home care is designed for those who are homebound due to severity of illness or immobility. For reimbursement of allowable expenses, home health care services must be ordered by a physician. There has been record growth in the number of home health agencies springing up in the past decade. People's desire to be cared for in familiar surroundings by their families, versus an institution, has fueled the need for more agencies.

Although physical, occupational, and speech therapies may be obtained through home care, as well as home health aide services, a nurse must open the case file and the individual must warrant some type of nursing services to qualify. The majority of home care patients are elderly and experience a variety of problems needing nursing, such as chronic wounds, intravenous therapy, long-term indwelling urinary catheters, and tube feedings.

Foster Care or Group Homes

Foster care and/or group homes are for those older adults who can do most of their ADLs, but may have safety issues and require supervision with some activities such as dressing or taking medications. Foster or group homes generally offer more personalized supervision in a smaller, more family-like environment than a traditional nursing home and should be licensed to provide such services. Some persons offering this service have a small number of elders inside their existing own home residence, whereas others have purchased a larger dwelling for this purpose. This type of setting provides an alternative to nursing home care for some older persons. Although nurses may own and operate a group home, there is no requirement that a person have a health care background to do so, nor is there a requirement that a nurse's services be available, so persons should take care to investigate the facility prior to placement of a loved one there. Social workers can usually provide good information about local foster or group homes.

Independent Living

Independent living for older adults is often in the community, but as previously stated, may be available in many LTCFs. In the community setting, independent living arrangements often take the form of senior housing, such as with apartment complexes that are exclusively devoted to the elderly. The accommodations will be as homelike as possible with kitchens, bathrooms, living areas, and the like, similar to assisted living. The best form of independent living—outside of an older person's own home—is one in which the owners and managers have an understanding and appreciation for the needs and capabilities of the elderly adult. Such living situations generally make accommodations for those in their later years with additions such as extra handrails, nonslip flooring, adequate elevators, facility security systems, and friendly room layouts with larger bathrooms and emergency call buttons. Senior

housing complexes that promote independent living often provide between 1 and 3 meals per day in a common dining area and provide large rooms to entertain guests for parties and family gatherings. An activity director may plan outings, with transportation provided. Doctors offering special services such as podiatric care may make regular visits to the facility and set up a clinic for the day. Nurses working in this setting may focus on primary prevention, that is, health promotion/disease prevention activities such as educational programs. Overall, independent living is an excellent alternative for older adults who feel more comfortable in a safe, supervised surrounding that is less isolated than living alone in their own home, but still allows them complete independence in ADLs and **instrumental ADLs (IADLs)**.

Adult Day Care

Adult day care or day services provide yet another avenue for older adults who are unable to remain at home during the day without supervision. Usually these services are used by family members who are caring for older parents or loved ones in their own home, but who may work during the day and wish to have their relative safely cared for in their absence. This is an excellent alternative to institutionalization. "Adult day services are community-based group programs designed to meet the needs of functionally and/or cognitively impaired adults through an individual plan of care. These structured, comprehensive programs provide a variety of health, social, and other related support services in a protective setting during any part of a day, but less than 24-hour care" (National Adult Day Services Association, 2005).

Adult day care programs may be sponsored by a variety of different organizations including churches, hospitals, health care systems, or the local YMCA. Centers provide socialization, planned outings, nutritional meals, and therapeutic activities that would appeal to older adults with moderate physical and/or mental

Box 1-3 Research Highlight

Aim: This study described the meaning of caring for geriatric nurses.

Methods: Parse's phenomenology was used to survey 30 nurses in Taiwan who worked on medical-surgical units caring for older adults. The nurses were asked open-ended questions about the meaning of caring in providing care to the elderly.

Findings: The researcher concluded that, for geriatric nurses, the meaning of caring included several concepts: deliberation, concern, tolerance, sincerity, empathy, initiative, and dedication. The author suggests that caring for the elderly should be natural and not superficial in order for the elderly to feel cared for.

Conclusion: Geriatric nurses in this study demonstrated the meaning of caring in several distinct ways. Core moral and ethical values appeared in their descriptions of the meaning of caring for older adults. Nurses may improve their care of older adults by attending to these core concepts related to caring. Gerontological nursing education may benefit by including more about caring theory.

Source: Lui, Shwu-Jiaun. (2004). What caring means to geriatric nurses. *Journal of Nursing Research, 12*(2), 143–152.

Critical Thinking Exercises

1. Do this exercise with another student as a partner. Close your eyes. Picture yourself as an 85-year-old. Note your appearance, sights, sounds, and surroundings. Open your eyes and describe yourself at 85 to your partner. Then discuss how your mental image of yourself as an older person might have been influenced by your family history, grandparents, and perceptions about aging.
2. Go to a local card shop and browse. Look at the birthday cards that persons might buy for someone getting older. What do they say about society's attitudes towards aging? Do the cards you read point out any areas that we stereotype as problems with advancing age?
3. Complete this sentence: Older people are . . .

   List as many adjectives as you can think of. After making your list, identify how many are negative and how many are positive descriptors. Think about where your ideas came from as you did this exercise.
4. Check out the Web site at www.geronurseonline.com. How could you use this Web site to enhance your knowledge about the care of older adults? What services are available through the Web site?
5. Look at the list of competencies for gerontological nurses in Table 1-2. How many of these competencies do you feel you meet at this point? Make a conscious effort to develop these skills as you go through your career.
6. Visit a local nursing home that offers various levels of care. Call ahead of time to arrange a tour from a nurse and ask questions about the services they offer to older adults.

decline. All functions are supervised by qualified personnel. Services are offered only during the day, often from 6 a.m.–6 p.m. (or normal business hours) with an emphasis on recreation and some health promotion. Some programs offer weekend hours. Costs vary depending on the sponsoring agency.

Summary

In conclusion, our attitudes about aging and caring for the elderly are influenced by many factors. Because of the changing population, all nurses need to have basic competence in the care of older adults. Gerontological nursing practice is guided by standards and core competencies. The scope of practice may be expanded with formal advanced education, and certification at any level is a way to demonstrate expertise.

There are many settings in which the gerontological nurse may practice. Additionally, there are emerging subfields of gerontology that offer promise for new future roles for nurses that care for the elderly. Nurses should explore the various career options open to them in this field.

Personal Reflections

1. How do you feel about aging? Do you dread getting older, or look forward to it? Do you see advanced age as a challenge or something to fear?
2. Have you ever cared for an elderly person before? If so, what was that experience like? How do you feel about caring for older adults in your nursing practice?
3. What do you think about nurses who work in nursing homes? Have you ever considered a career in gerontology? What are the positives you can see about developing expertise in this field of nursing?
4. Have you ever seen ageism in practice? If so, think about that situation and how it could have been turned into a positive scenario. If not, how have the situations you have been in avoided discrimination against the elderly?
5. Which of the settings for gerontological nursing practice appeal to you most at this time in your professional career? Is there any one setting that you can see yourself working in more than another? Do you think this will change as you progress in your career?

Glossary

Activities of daily living (ADLs): Include bathing, dressing, grooming, showering, and toileting activities.

Ageism: A negative attitude toward aging or older persons.

Core competencies: The essential skills and knowledge needed to provide quality care to older adults.

Financial gerontology: An emerging field that combines financial management, planning, and knowledge with special coursework and training in the unique needs of the elderly.

Geriatrics: Medical care of the aged.

Gerontological nursing: A speciality within nursing practice where the clients/patients/residents are older persons.

Gerontological rehabilitation nursing: Gerontological nursing care of older persons in which rehabilitation is emphasized; care for those with rehabilitation problems such as stroke, brain injury, neurological disorders, or orthopedic surgeries.

Gerontology: The study of aging or the aging process.

Geropharmaceutics: A specialty in medications and pharmacy of older adults.

Hospice: Provides holistic, comprehensive care to the terminally ill patient and his or her family through the dying and bereavement process.

Independent living: A type of setting/housing in which the older adult performs all IADLs and ADLs independently or with minimal supervision.

Instrumental activities of daily living (IADLs): Include shopping, talking on the telephone, keeping a checkbook, housework, and the like; contrasted with ADLs.

Middle old: Those persons age 75–84 years.

Old old: Those persons ages 85 years and over; sometimes called the oldest old, the very old, or the frail elderly.

Rehabilitation: Care that promotes the maximum functional capacity of adults recovering from or adapting to a long-term or chronic condition.

Skilled care: Setting in which patients require less nursing care than the acute hospital, but more than other long-term settings; generally for those with

higher acuity; may also be called skilled nursing facilities (SNFs); often found in long-term care facilities.

Social gerontology: A subfield of gerontology focused on the social aspects of aging.

Standards of care: The goals set for quality care delivery to older adults.

Subacute care: For complex patients who require more intensive nursing care than the traditional nursing home can provide, but less than the acute care hospital.

Unlicensed assistive personnel (UAP): Includes nursing assistants, nurse technicians, and other staff who do not have licenses to practice.

Young old: Those persons ages 65–74.

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Chapter 2

The Aging Population

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LEARNING OBJECTIVES

At the end of this chapter, the reader will be able to:

1. Review statistics related to aging in United States.
2. Describe social and economic issues related to aging in the United States.
3. Discuss aging across different cultures.
4. List differences between aging in the 21st century and aging in the past.
5. Critically evaluate successful aging.

KEY TERMS

- Baby boomers
- Centenarian
- Chronic disease
- Cohort
- Demographic tidal wave
- Elderly
- Foreign-born
- Graying of America
- Native-born
- Older adult
- Oldest old
- Pig in a python
- Seniors

U.S. society, and indeed, U.S. families, will be greatly challenged by the **graying of America** over the next few decades. A steadily growing aging population has the potential to affect social policy, societal resources, businesses, and communities, not to mention health care systems.

The Numbers

Since 1900, the U.S. population has tripled, but the number of **older adults**, those over age 65, has increased 11-fold (MIAH, CDC, & GSA, 2004). The older population in the United States

grew from 3 million to 36 million in the 20th century alone. Just over 12% (36 million) of the population in the United States was 65 or older in 2000 (Munnell, 2004; U.S. Census Bureau, 2001). Of this population,18.4 million (53%) were aged 65–74. In the 2000 census, there were 12.4 million 74- to 85-year-olds (35% of the older population). And the number of **oldest old**, those people 85 years of age or older, grew from 100,000 in 1900 to 4.2 million in 2000 (Federal Interagency Forum, 2004; U.S. Census Bureau, 2001). By the mid-twenty-first century, old people will outnumber young people for the first time in history (Winokur, 2005).

Why the Recent Increase in the Number of Older Adults?

It is expected that, by 2025, the number of persons 65 and older in the United States will increase from 12% of the population (in the year 2000) to 19% (Munnell, 2004). The recent trend of increasing numbers of older adults in the United States is due to two main causes: the increased life expectancy of our seniors and the fertility of the U.S. population at various points in time.

In 1935, when Social Security was enacted, the life expectancy for persons age 65 was 12 years for males (or 77 years total) and 13 years for females (or 78 years total). This has risen to 16 and 19 years, respectively. By 2080, life expectancy for 65-year-olds is expected to have increased to 20 years and 23 years, respectively (Munnell, 2004). There is less of a racial difference in life expectancy than in other parameters of aging. In 2001, life expectancy at birth was 5.5 years higher for whites than for blacks, but at age 65, whites could expect to live for 2 years longer than blacks. For those who live to age 85, the life expectancy for black people is slightly higher than for whites (Federal Interagency Forum, 2004).

Changes in life expectancy throughout the 20th century were mainly due to improved sanitation, advances in medical care, and the implementation of preventive health services (MIAH, CDC, & GSA, 2004). In the early 1900s, deaths were mostly due to infectious diseases and acute illnesses. The older population of today, however, must deal with challenges unfamiliar to their own parents. These are the challenges of dealing with **chronic disease** as well funding for health care services. The average 75-year-old now has three chronic diseases and uses five prescription drugs (MIAH, CDC, & GSA, 2004). Modern treatments for diseases that used to kill older adults, such as myocardial infarction and stroke, as well as the improved technical procedures for health services such as transplants and intensive care, have contributed to the increased longevity of the population.

Health care costs, including medication costs, have thus become a primary issue for many **seniors**. The repercussions of rising health care costs have been felt within the state and federal governments, as they seek to help support their senior citizens' health. Nearly 95% of health care expenditures for older Americans are for chronic diseases (MIAH, CDC, & GSA, 2004).

Fertility of the population also affects the number of older adults. The fertility rate in the United States has been steadily falling for the past 200 years. In 1800, the average woman had 7 children. By the end of World War II, this had decreased to 2.4 children. But after the war, from 1946 to 1964, the fertility rate increased to 3.5 children (Munnell, 2004). Of course, one could argue that some of these changes have less

to do with fertility rate and more to do with the influence of other factors such as the acceptance and use of birth control as well as the changing values of different generations. The current issue in aging has to do with the **baby boomers**. This extremely large segment of the American population, who were born between 1946 and 1964, will start turning 65 in 2011. Because of the number of baby boomers, the number of older adults will increase dramatically between 2010 and 2030. This anticipated increase has alternatively been called a **demographic tidal wave** (MIAH, CDC, & GSA, 2004) or a **pig in a python** (Munnell, 2004).

Beginning in 2012, nearly 10,000 Americans will turn 65 every day (MIAH, CDC, & GSA, 2004). By 2030, the older population will comprise 20% of the total population of the United States (which will be about 70 million people) (Federal Interagency Forum, 2004; MIAH, CDC, & GSA, 2004). This group of older adults will be the "healthiest, longest lived, best educated, most affluent in history" (Experience Corps, 2005). After 2030, the population of oldest old (those over 85 years) will grow the fastest. According to the Federal Interagency Forum (2004), the U.S. Census Bureau projects that the population of those 85 and older could grow from 4.2 million in 2000 to 21 million by 2050 (see **Figure 2-1**).

The Distribution of Seniors in the United States

The distribution of older Americans varies across the United States, due in part to patterns of migration after retirement. It is also due to birth and death rates in the various states and regions. For instance, in 2002, Florida (17%), Pennsylvania (15%), and West Virginia (15%) had the highest numbers of persons 65 and older (Federal Interagency Forum, 2004). Between 1990 and 2000, the West and South regions grew the fastest. This growth ranged from a 1% increase in seniors in Rhode Island to a 72% increase in Nevada. The other states with fast growing senior populations included Alaska (60% increase), Arizona (39%), and New Mexico (30%). The District of Columbia was the only area to show a decline in the 65-and-older group (U.S. Census Bureau, 2001).

Although every state showed growth in the numbers of seniors, in many areas seniors represented a smaller proportion of the population. In the Midwest, the proportion of persons 65 and older declined from 13% in 1990 to 12.8% in 2000. Similar declines in proportion were seen nationwide (U.S. Census Bureau, 2001).

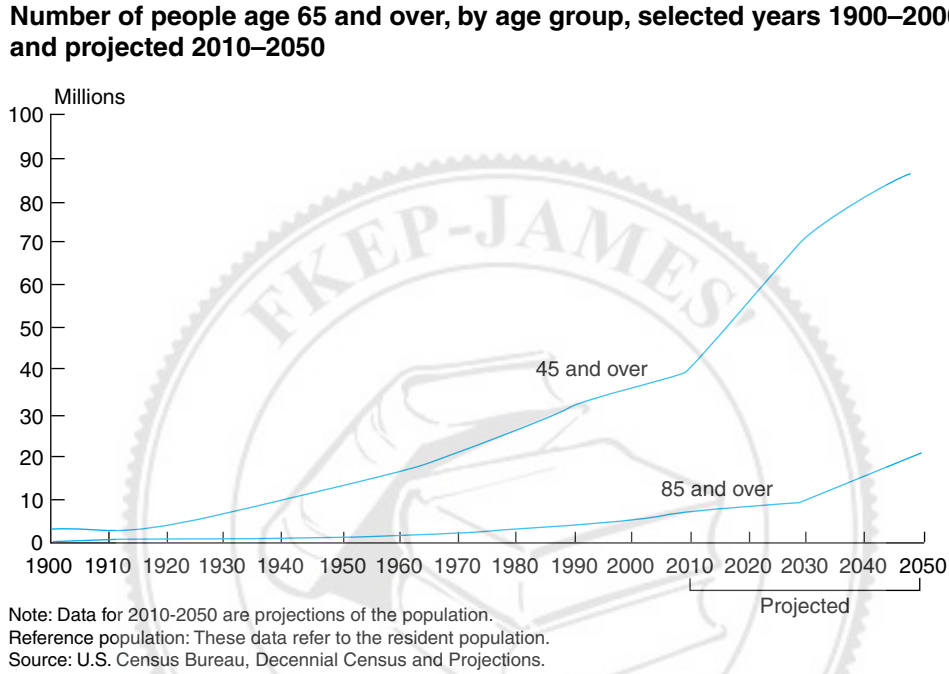
Issues of Gender

Women outnumber men in the United States, a trend that is expected to continue. In 2003, 58% of the population was female. In the 85 and older age group, women accounted for 69% of the population (Federal Interagency Forum, 2004). In fact, the age groups 65–74 and 85 and older had nearly 2 million more women than men, and the 75–84 age group had nearly 3 million more women (U.S. Census Bureau, 2004).

In 2000, the sex ratio for the general U.S. population was 96 males for every 100 females. This ratio declines steadily with age. For persons 65–74 it was 82:100; for those 85 and older, it was 41:100 (or more than two women for every man) (U.S. Census Bureau, 2004).

In 2003, over 75% of men ages 65–74 were married, compared to 56% of women in the same age group. Only 36% of women ages 75–84 were married; this dropped to 14% in the 85 and older age group. For men 85 and

Figure 2-1 Real and projected numbers of people 65+ in the United States, 1900–2050.



Source: Federal Interagency Forum on Aging-Related Statistics. November 2004. *Older Americans 2004: Key indicators of well-being*. Washington, DC: U.S. Government Printing Office. Retrieved May 27, 2005, from http://www.agingstats.gov/chartbook2004/default.htm

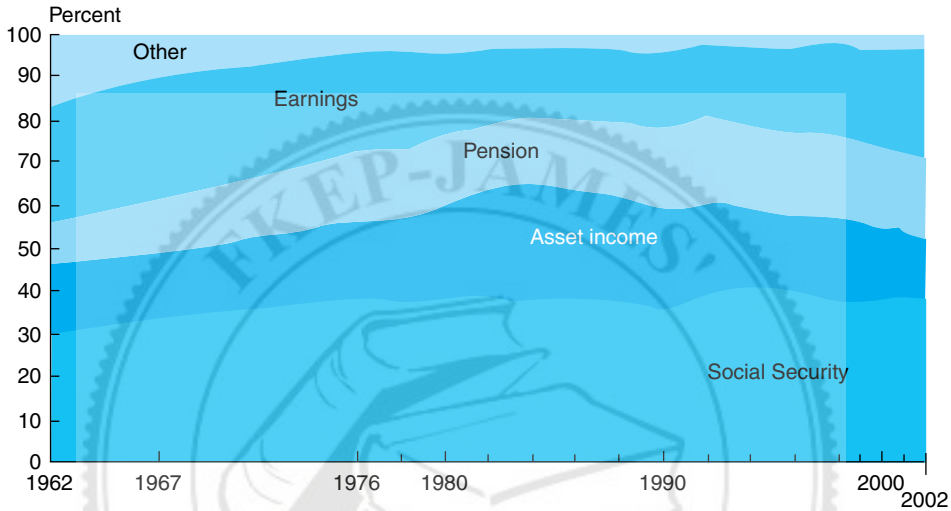
older, 59% were married. Women age 65 and older were three times as likely as men of the same age to be widowed, 44% compared to 14%. In 2003, 78% of women age 85 and older were widowed, compared to 35% of men age 85 and older. Divorce is more unusual in this age group. In 2003, 7% of older men and 9% of older women were divorced. A smaller proportion of older adults had never been married (Federal Interagency Forum, 2004).

Education

The level of education can affect the socioeconomic status of the older adult (**Figure 2-2**). Those with more education tend to have more money, higher standards of living, and above-average health. The comparisons over the years are interesting. In 1950, 17% of the older adults in the United States had graduated from high school, and 3% had at least a bachelor's degree.

Figure 2-2 Sources of income for persons 65+.

Distribution of sources of income for the population age 65 and over, selected years 1962–2002



Reference population. These data refer to the civilian noninstitutionalized population.
Source: U.S. Census Bureau, Current Population Survey. Annual Social and Economic Supplement; 1963 Survey of the Aged; and 1968 Survey of Demographic and Economic Characteristics of the Aged.

Source: Federal Interagency Forum on Aging-Related Statistics. November 2004. *Older Americans 2004: Key indicators of well-being*. Washington, DC: U.S. Government Printing Office. Retrieved May 27, 2005, from http://www.agingstats.gov/chartbook2004/default.htm

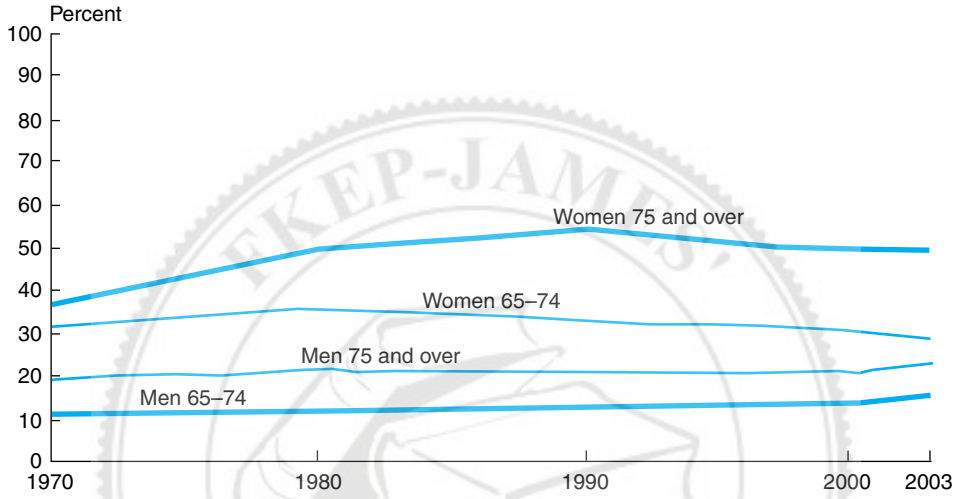
In 2003, however, 72% of older men and 71% of older women had graduated from high school, while 23% of older men and 13% of older women had graduated from college. Differences also exist in education between ethnic groups. In 2003, 76% of older non-Hispanic whites, 70% of older Asians, 52% of older blacks, and 36% of older Hispanics had completed high school. Also in 2003, 29% of older Asians, 20% of non-Hispanic whites, 10% of older blacks, and 6% of older Hispanics had at least a bachelor's degree (Federal Interagency Forum, 2004).

Living Arrangements

Living arrangements of older adults are linked not only to income, but also to health status. Older people who live alone are more likely than their married counterparts to live in poverty. In 2003, older men were more likely to be living with a spouse than were older women (73% compared to 50%; see **Figure 2-3**). Older women were twice as likely as older men to be living alone (40% compared to 19%). Living arrangements, like education, also varied by race

Figure 2-3 Population 65+ living alone, 1970–2003.

Population age 65 and over living alone, by age group and sex, selected years 1970–2003



Reference population. These data refer to the civilian noninstitutionalized population.
Source: U.S. Census Bureau, Current Population Survey. Annual Social and Economic Supplement.

Source: Federal Interagency Forum on Aging-Related Statistics. November 2004. *Older Americans 2004: Key indicators of well-being*. Washington, DC: U.S. Government Printing Office. Retrieved May 27, 2005, from http://www.agingstats.gov/chartbook2004/default.htm

and ethnicity. Older Asian women were more likely than older women of other races to live with relatives other than a spouse. Older non-Hispanic white and older black females were more likely than others to live alone. Older black men lived alone three times as much as older Asian men. Older Asian men were more likely than other races and ethnicities to live with relatives other than a spouse. The state of living alone increases as age increases. Older people who lived alone had higher poverty rates than those who lived with their spouse. In 2002, 16% of older men and 21% of older women who lived alone lived in poverty. Only 5% of older married men and women lived in poverty (Federal Interagency Forum, 2004).

Effects of Ethnicity

The growing aging population consists of a significantly increased proportion of minorities. Minority elders will make up 22% of the elderly population over the next 20 years (Ross, 2000). The diversity as well as the vast increase in number of this group provides a distinct challenge in meeting health care needs. The losses (spouses, friends, independence, levels of func-

Case Study 2-1

Mrs. Johnson is an 87-year-old African American female admitted to the hospital from her home. She is widowed and has no children. Her neighbors watch out for her, bringing her groceries and making sure that she's OK each day. Mrs. Johnson's neighbor, Mrs. Edwards, accompanies her to the hospital.

Mrs. Johnson is admitted for shortness of breath, attributed to nonadherence to her medication regimen for congestive heart failure. She is alert, oriented, and very pleasant.

Mrs. Edwards takes you aside and tells you that she is concerned about Mrs. Johnson's home situation.

Questions

1. What might you suspect about Mrs. Johnson's financial situation?
2. What might you suspect about Mrs. Johnson's home situation?
3. How might these factors contribute to her hospital admission?
4. Based upon your suspicions, what questions might you ask Mrs. Johnson as you admit her to your unit?

tion, status in society) often encountered in aging coupled with low socioeconomic status and lifetime racial discriminations put this group at increased risk for poor outcomes (Markides & Miranda, 1997). An understanding of cultural diversity and the unique challenges it poses is needed to address health issues and promote wellness.

The older population in the United States is growing more racially and ethnically diverse as it ages. In 2003, 83% of U.S. older adults were non-Hispanic whites, 8% of the older population was black, 3% Asian, and 6% Hispanic (see **Table 2-1**). By 2050, projections are that this will change to 61% non-Hispanic white, 18% Hispanic, 12% black, and 8% Asian. The older Hispanic population is projected to grow the fastest, from 2 million in 2003 to 15 million in 2050, and to be larger than the older black population by 2028. The older Asian population is also projected to increase, from 1 million in 2003 to 7 million in 2050 (Federal Interagency Forum, 2004).

African Americans

African American elders make up the largest cultural minority and are projected to increase from 8% to 12% of the older population by 2050. Currently, 26.5% of African American elders live in poverty compared to 8.2% of elderly whites. In fact, in 1998, divorced black women ages 65 to 74 had a poverty rate of 47%,

Table 2-1 U.S. POPULATION AGE 65+ BY RACE AND HISPANIC ORIGIN, 2000

Total 65+	Numbers	Percent
Non-Hispanic		
Black	2,787,427	8.0%
American Indian/Alaskan Native	124,797	0.4%
Native Hawaiian/Pacific Islander	19,085	0.1%
Asian	796,008	2.3%
Two or More Races	264,588	0.8%
Other Race	21,397	0.1%
Hispanic (any race)	1,733,591	5.0%
Total Minority	5,746,893	16.4%
White (Alone—Non-Hispanic)	29,244,860	83.6%
Total 65+	34,991,753	100.0%

Data Set: Census 2000 Summary File 1 (SF 1) 100-Percent Data
Source: www.aoa.gov/prof/Statistics/minority_aging/facts_minority_aging.asp

one of the highest of any subgroup of older Americans. There is also a great disparity in net worth between black and white households headed by older Americans. In 1999, net worth among older black households was estimated to be $13,000, compared to $181,000 among older white households (Administration on Aging, 2000). The lack of economic resources and poor access to health care add to the increased incidence of disease with greater complications in this subgroup.

Higher rates of diabetes, hypertension, and chronic kidney disease are seen in African Americans (Ross, 2000). African Americans are twice as likely as whites to have diabetes (Illinois Department on Aging, 2001). African American men have higher incidences of lung and prostate cancer as compared to whites. African Americans' overall risk to develop kidney disease is highest of the senior groups. Nutritional intake plays a large part in these diseases. Kumanyika (1997) notes that high-fat, low-fiber diets cause or aggravate these illnesses. Physical activity levels are lower among less educated older Americans, both white and African American.

African Americans often do not use routine preventive services at recommended rates and are less likely to have a regular provider of health care, opting instead for hospital outpatient departments, historically known for long waits and inconsistent providers (Markides & Miranda, 1997). The top five causes of death among African Americans are heart disease, cancer, stroke, diabetes, and pneumonia/influenza (Sahyoun, 2001). From these statistics, it is evident that preventive services have the potential to affect the longevity of this population.

HISPANICS

The Hispanic population is the second largest and most rapidly growing ethnic minority in the United States (Hazuda & Espino, 1997). The over-65-year-old Hispanic population is the

fastest growing segment of the total U.S. population. By 2050, Hispanic elderly will make up 16.4% of all U.S. elderly, adding up to 13.4 million Hispanics over the age of 65 (Administration on Aging, 2000). The Hispanic population in the United States consists of a diverse population from Mexico, Cuba, Puerto Rico, the Dominican Republic, and other countries of Central and South America. The poverty rate in 2001 for Hispanic elderly in the United States was more than twice that of the total older population (Administration on Aging, 2003).

The chronic diseases of cardiovascular disease, diabetes, cancer, and cerebrovascular disease are seen in significant numbers in the Hispanic population. Centers for Disease Control (CDC) data show Hispanics are less likely to obtain preventive services such as flu and pneumonia vaccines and mammograms as compared to whites (Ross, 2000). The age-adjusted rate of diabetes in this population is 44% higher than for non-Hispanic whites (Administration on Aging, 2003). Hispanics also have higher rates of cervical, esophageal, gallbladder, and stomach cancer as compared to whites. Poverty levels, only slightly lower than African American elderly, and language barriers are often impediments to accessing health care coverage and health care services (Ross, 2000). The top five causes of death among Hispanics are heart disease, cancer, stroke, chronic obstructive pulmonary disease (COPD), and pneumonia/influenza (Sahyoun, 2001).

In 2002, 72% of Hispanics age 60 and over lived in four states: California, Florida, New York, and Texas (Administration on Aging, 2003). Hispanics in general receive assistance in the home when functionally declining, versus in long-term facilities (Angel & Angel, 1997). Family members frequently act as their caregivers, and multigenerational families under one roof are common. On average, Hispanic families and households are larger than non-Hispanic families and households (Aranda & Miranda, 1997). Overall, the percentage of Hispanic elderly living alone is lower than that of the general population (Administration on Aging, 2003). Older Hispanics are more likely to be married and to rely on family over friends when compared to white elderly.

Asians and Pacific Islanders

This subgroup actually is composed of 40 different ethnic groups with various economic, educational, and health profiles (Ross, 2000). Some identified ethnicities include Asian, Chinese, Filipino, Japanese, Pacific Islander, and Hawaiian. National data, however, do not necessarily discern between ethnicities, which complicates identifying demographics and patterns for each culture. The Asian American and Pacific Islander population has been the fastest growing racial/ethnic group in the United States recently, having increased 141% between 1970 and 1980 and 99% between 1980 and 1990 (Elo, 1997). According to the U.S. Bureau of the Census, projections for the years 2000–2050 include population increases for Asian Americans and Pacific Islanders from 2.4% to 6.5% of the U.S. population (Administration on Aging, 2000).

Life expectancy data have historically shown an advantage for the Asian American and Pacific Islander population. Census data from 1995 showed life expectancy at birth of Asian Americans and Pacific Islanders to be 79.3 years for males and 84.9 years for females, as compared to 73.6 and 80.1 for white males and females, respectively. Elo (1997) questions inconsistencies in the data due to the heterogeneity of the group.

The evaluation of mortality data did place Chinese, Japanese, and Filipinos well below white Americans. As a whole, cancer and heart disease contribute less to all-cause mortality in the Asian American and Pacific Islander population than in whites. Cerebrovascular disease, however, is a more prominent cause of death for some subgroups of Asian Americans and Pacific Islanders (Elo, 1997). Discrepancies are seen in mortality causes depending on whether persons are native or foreign-born, pointing to the impact of acculturation in U.S. society. But overall, the top five causes of death among Asian Americans or Pacific Islanders are heart disease, cancer, stroke, pneumonia/influenza, and COPD (Sahyoun, 2001).

Kitano, Tazuko, and Kitano (1997) note the inconsistency of this minority group's use of community professional resources. Dependence on familial and informal ethnic resources is seen more often. Length of the family's time in this country (recent arrival vs. present a century) impacts comfort and ease of resource use. Health care providers will need to address not only the diversity within this minority group, but also the time or extent of acculturation and assimilation within each subgroup.

American Indians and Alaskan Natives

The category of American Indians and Alaskan Natives represents 500 nations, tribes, bands, and native villages in which 150 languages are used (Kramer, 1997). Although the American Indians and Alaskan Natives make up a small percentage of the nation's elderly, they are one of the fastest growing groups of minority elderly, behind Asian and Hispanic groups (Chapleski, 1997). American Indians and Alaskan Natives over the age of 60 were 152,000 in number per the 2000 census (Administration on Aging, 2000). The over-75 years of age **cohort** of American Indians and Alaskan Natives is expected to double by the year 2050 (Chapleski). Two thirds of American Indian and Alaskan Native elders live in 10 states. Historical and political developments forced the concentration of American Indians first onto reservations west of the Mississippi and then to more urban areas (Chapleski). Due to these relocation efforts, American Indians and Alaskan Natives are not necessarily in close proximity to Indian Health Services (IHS) facilities. Only 59% of this population actually lives in IHS areas (Chapleski). Although the majority of American Indians and Alaskan Natives live in rural areas, many have moved to urban areas.

Chronic disease prevalence in American Indians and Alaskan Natives increased significantly in the 20th century. The IHS made tremendous efforts to increase life expectancy from 51 years in 1940 to 71 years in 1980 through a reduction in infectious disease. Now, however, there is a tremendous prevalence of chronic disease due to dietary changes, sedentary lifestyles, and technology that is similar to Western society (Kramer, 1997). The leading causes of death for older American Indians and Alaskan Natives are heart disease, cancer, diabetes, stroke, and COPD (Sahyoun, 2001).

Diabetes is a serious threat to morbidity and mortality in the American Indian and Alaskan Native population. They are 2.5 times more likely to get diabetes as compared to same-age whites (Ross, 2000). Complications of diabetes are also seen more frequently, with end-stage renal disease occurring 6.8 times more in American Indians and the number of nontraumatic lower extremity amputations far exceeding non-American Indian populations (Kramer, 1997). These high rates of disease and complications are seen in younger age cohorts as well.

Heart disease is the leading cause of death among American Indians and Alaskan Natives due to a rise in risk factors (obesity, diabetes, smoking, hypertension, high cholesterol, and sedentary lifestyle) (Kramer, 1997). Younger American Indians (in their 40s) experience a three to four times greater cardiovascular mortality than the general population. Hypertension prevalence in general is low, but when coupled with obesity and diabetes, long-term effects are devastating—end stage renal disease, proliferative retinopathy, cerebrovascular disease, and myocardial infarction (Kramer, 1997). Rheumatoid arthritis is seen in higher rates in American Indians as compared to Alaskan Natives and whites, with individual Indian tribes affected in larger numbers. Cancer is the third leading cause of death of American Indians. Survival rates are the lowest compared to any other U.S. population (Kramer, 1997). Lung cancer is most common.

The National Indian Council on Aging study of 1981 noted the health, functional, and social status of American Indian elders (Kramer, 1997). It was noted that 45-year-olds on reservations and 55-year-olds in urban areas were considered elders and matched criteria of white Americans at age 65 (Kramer). This shifts the necessity for health interventions and disease management to occur at a much younger age to impact the significant mortality and morbidity in the American Indian and Alaskan Native population.

Other Minorities

The Older Foreign-Born Population in the United States

The **foreign-born** are people who are living in the United States who were not U.S. citizens at birth. As of 2000, the 65+-year-old foreign-born population in the United States numbered 3.1 million. More than one third of U.S. foreign-born immigrants are from Europe, a pattern that will change in the future according to immigration laws and world events. It is expected that, in the future, the older foreign-born will be more likely to come from Latin America or Asia (He, 2000).

Nearly 66% of the older foreign-born in the United States have lived here for more than 30 years. The older foreign-born are also twice as likely to be naturalized citizens as the foreign-born of all ages (see **Table 2-2**). Almost 50% of the older foreign-born have not completed high school (compared to 29% of native-born older Americans). Older foreign-born are more likely than **native-born** elders to live in family households, and their poverty rate is also higher than the native-born U.S. citizens. They are also less likely to have health coverage (He, 2000).

U.S. Veterans

Changes in the population of older Americans who are veterans of the armed services are also expected as the Vietnam-era cohort ages. In 2000, there were 9.8 million veterans age 65 and older in the United States—two of every three men 65 and older were veterans. More than 95% of these veterans are male. Between 1990 and 2000, the number of male veterans age 85 and older increased from 142,000 to 400,000 (**Figure 2-4**). There is a projected increase after 2010 as the Vietnam-era cohort ages. The number of veterans 85 and older is expected to increase steadily to a peak of 1.4 million in 2012 (Federal Interagency Forum, 2004). This increase in the number of veterans will challenge the U.S. Department of Veteran's Affairs, which has traditionally supplied a major

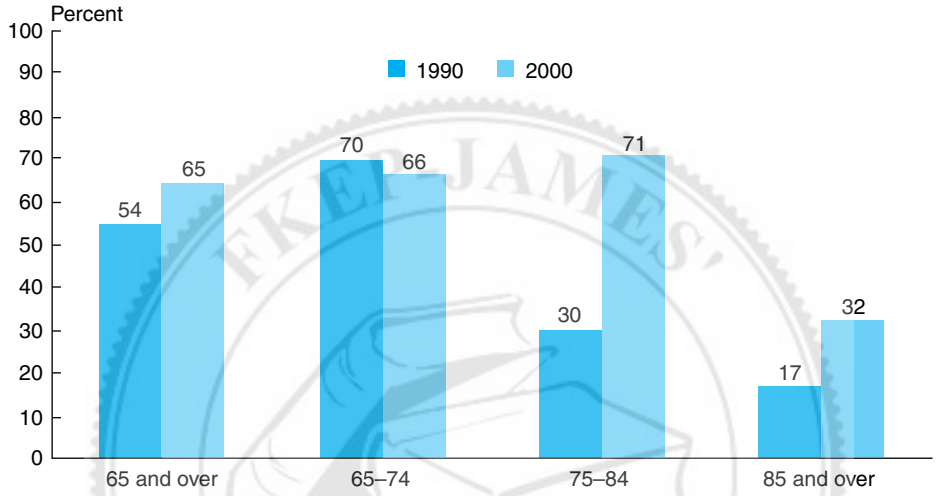
Table 2-2 AGE AND SEX OF THE POPULATION AGED 65 AND OVER BY CITIZENSHIP STATUS: MARCH 2000 (NUMBERS IN THOUSANDS)

		Total		Nativity/Citizenship							
				Native		Foreign Born		Naturalized Citizen		Not a Citizen	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total	Total	32,621	100.0	29,507	100.0	3,115	100.0	2,188	100.0	927	100.0
	65 to 74 years	17,796	54.6	16,019	54.3	1,778	57.1	1,195	54.6	582	62.8
	75 years and older	14,825	45.4	13,488	45.7	1,337	42.9	992	45.4	345	37.2
	– 75 to 84 years	11,685	35.8	10,721	36.3	965	31.0	695	31.8	269	29.1
	– 85 years and older	3,140	9.6	2,767	9.4	373	12.0	297	13.6	75	8.1
Male	Total	13,886	100.0	12,540	100.0	1,346	100.0	963	100.0	384	100.0
	65 to 74 years	8,049	58.0	7,251	57.8	799	59.3	543	56.4	256	66.7
	75 years and older	5,837	42.0	5,289	42.2	548	40.7	420	43.6	128	33.3
	– 75 to 84 years	4,796	34.5	4,390	35.0	406	30.1	299	31.0	107	27.9
	– 85 years and older	1,041	7.5	899	7.2	142	10.5	121	12.6	21	5.5
Female	Total	18,735	100.0	16,967	100.0	1,768	100.0	1,225	100.0	543	100.0
	65 to 74 years	9,747	52.0	8,768	51.7	979	55.4	652	53.3	327	60.1
	75 years and older	8,988	48.0	8,199	48.3	789	44.6	573	46.7	217	39.9
	– 75 to 84 years	6,889	36.8	6,331	37.3	559	31.6	396	32.3	163	29.9
	– 85 years and older	2,099	11.2	1,868	11.0	231	13.0	176	14.4	54	10.0

Source: U.S. Census Bureau. Current Population Survey, March 2000. Internet Release Date: October 2, 2002.

Figure 2-4 Male veterans 65+, 1990–2000.

Percentage of men age 65 and over who are veterans, by age group, United States and Puerto Rico, 1990 and 2000



Reference population. These data refer to the resident population of the United States and Puerto Rico.
Source: U.S. Census Bureau, Decennial Census.

Source: Federal Interagency Forum on Aging-Related Statistics. November 2004. *Older Americans 2004: Key indicators of well-being*. Washington, DC: U.S. Government Printing Office. Retrieved May 27, 2005, from http://www.agingstats.gov/chartbook2004/default.htm

proportion of the health care that veterans receive.

The Aging Disabled Population

Advances in health care have increased the lifespan of persons with disability. These include those traumatically injured as well as those born with disability.

Traumatically injured persons are now more likely to received expert emergency services at the time of their accident. Advances in intensive care services, surgical services, diagnostic services, and the knowledge and skills of health care workers have combined to prolong the lives of persons who used to die within days or months of their traumatic injuries. For the first time in history, persons with spinal cord injuries and brain injuries are living to become elderly. They are truly entering a time in their life that is unpredictable, because they are the first to reach these advanced ages. Unforeseen effects of aging in persons with spinal cord injury, for example, include shoulder injury (from repetitive movements related to wheelchair mobility) and increased risk of pressure ulcers.

Developmentally disabled individuals are another special aging group. Technological advances and improvements in health care are

prolonging the lives of those with disabilities such as mental retardation. Twelve percent of persons with developmental disabilities are now 65 and older. This translates to between 200,000 and 500,000 people. There are great implications for the U.S. health care system as this population continues to age, grow, and outlive their parents. Unforeseen secondary health problems are beginning to be seen in this older population, including obesity, chronic skin problems, and early aging (Connolly, 1998).

Elderly Inmates

One oft-forgotten segment of the elderly population in the United States is the prisoners. There are more than 55,000 inmates over the age of 55 in the United States and even more are growing old. It is anticipated that the number of inmates over age 55 could double every 5 years (Winokur, 2005). Bureau of Justice statistics note that in 2003 there were 208 male inmates age 55 or over per 100,000 U.S. population. Females 55+ accounted for 8 per 100,000. In 2003, inmates 55+ accounted for 5.9% of the federal prison population.

Elderly even has a different connotation in the world of jail cells. Due to the stresses of prison life and the earlier onset of age-related problems, "elderly" begins at age 50 or even earlier for those in prison (Schreiber, 1999). A 50-year-old inmate may have a physiological age that is 10–15 years older than his biological age, due to the use of illicit drugs, alcohol intake, and limited access to preventive care and health services. It can cost three times as much money to care for an older inmate, compared to a younger one. Inmates age 55 and older tend to have at least three chronic conditions, and up to 20% have a mental illness (Mitka, 2004). Aged inmates can require such complicated and costly procedures as dialysis three times weekly, special diets, and expensive medications. Adaptive equipment, such as walkers and wheelchairs, may also be needed for mobility. In 2003 in Texas, 1,159 inmates over the age of 65 required 24-hour skilled nursing care (McMahon, 2003).

Case Study 2-2

Mr. Everett is a 62-year-old inmate in a state penitentiary, admitted to your unit for hypertension, heart failure, and chest pain. He is accompanied by a prison guard, who watches your every move. The guard has handcuffed Mr. Everett to the bed.

This is the first prisoner that you've ever cared for. You are surprised about how old Mr. Everett looks. You complete your admission assessment and talk to him about the plans for his care.

Questions:

1. Why might this patient appear to be older than his stated age?
2. How could his social situation affect his plan of care, hospital stay, and recovery?

Prisoners have been called the only population in the United States with a legal right to health care. Due to these legal rights, and the expanding aging prison population, combined with tight federal and state budgets, it is no wonder that some think that the U.S. prison system is overdue for a health care crisis (Mitka, 2004). Some states, like Texas, have developed separate facilities for their geriatric prisoners. Others have integrated telemedicine into their facilities or developed chronic care clinics. And some, recognizing the likelihood of inmates not only aging in place in prison but also dying of chronic disease while in prison, have implemented hospice programs for their dying, elderly prisoners.

Mortality and Morbidity

Causes of Death

The leading cause of death for older adults in 2001 was diseases of the heart, followed by malignant neoplasms, cerebrovascular diseases, chronic lower respiratory diseases, influenza and pneumonia, and diabetes. Death rates for diseases of the heart and cerebrovascular disease decreased by one third from 1981 to 2001. Age-adjusted death rates for diabetes mellitus increased by 43% from 1981 to 2001, and death rates for chronic lower respiratory diseases increased by 62% during the same time period. Diseases of the heart and malignant neoplasms are the top two causes of death for people age 65 and older in the United States, regardless of race, gender, or ethnic origin. Race and ethnicity do play a part in other causes of death, however. In 2001, diabetes mellitus was the fifth leading case of death among black men, the fourth among Hispanic men, and the sixth among white men and men of Asian or Pacific Islander origin. For women age 65 and older, diabetes mellitus was the fourth leading cause of death for Hispanics and blacks, and the seventh leading cause of death among whites (Federal Interagency Forum, 2004).

Chronic Diseases

The prevalence of chronic diseases increases with age. Four of the six leading causes of death

Case Study 2-3

Mr. Andrew Crow is a 67-year-old American Indian. He has been unemployed for the past 5 years. He lives on a reservation in Oklahoma with his wife and three teenaged children. Mr. Crow came to the health clinic for a routine checkup. You note that he is overweight.

Questions:

1. How should you focus your physical assessment?
2. What chronic diseases might Mr. Crow be at high risk for?
3. What are the implications for his family?
4. Develop a plan of care for Mr. Crow and his family members.

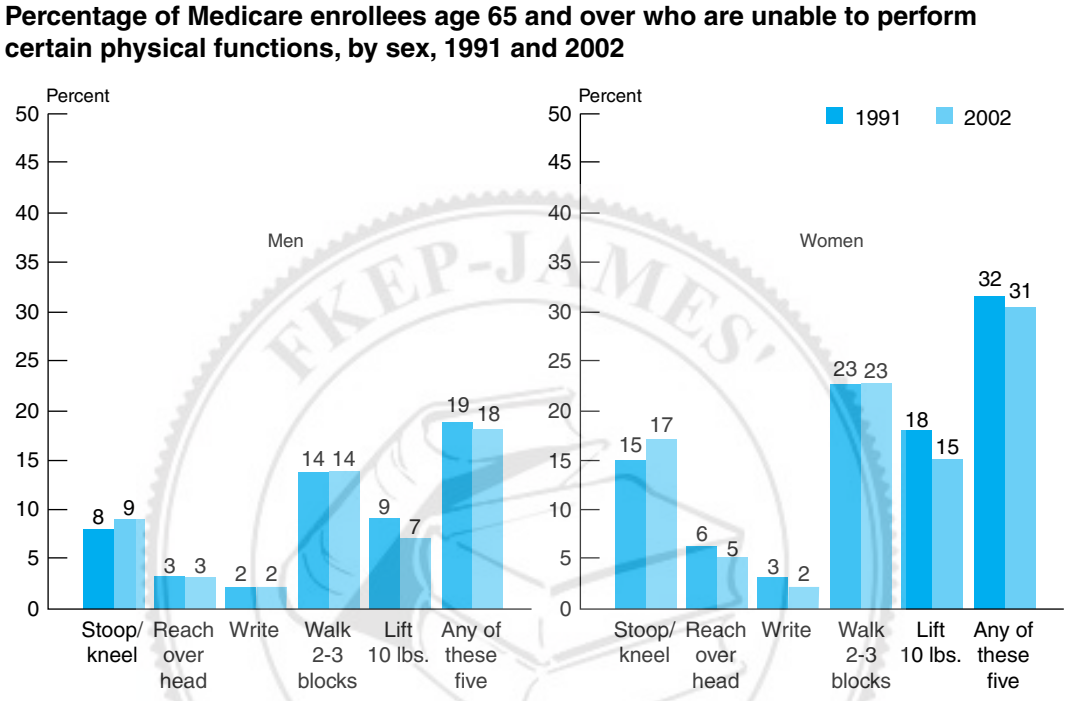
among older Americans are chronic diseases such as heart disease, stroke, cancer and diabetes. Older women report higher numbers of chronic diseases such as hypertension, asthma, chronic bronchitis, and arthritis, whereas men report more heart disease, cancer, diabetes, and emphysema. Ethnic and racial differences also exist in the prevalence of chronic diseases. Older blacks report higher levels of hypertension and diabetes than non-Hispanic whites, whereas Hispanics report higher levels of diabetes than non-Hispanic whites. Both diabetes and hypertension are increasing among older Americans (Federal Interagency Forum, 2004).

Sensory impairments and oral health problems become more frequent with aging. Early detection can prevent or postpone the physical, social, and emotional effects that these changes have on a senior's life. In 2002, nearly 50% of older men and nearly 33% of older women reported difficulty with hearing. Those age 85 and older reported more difficulty than those 65–74. Vision trouble affects about 18% of older adults. In 2002, of those people 65 and over who reported trouble with vision, 16% reported ever having glaucoma, 16% reported ever having macular degeneration, and 44% reported having cataracts in the past 12 months. Thirty-eight percent of persons 85 years of age or older reported edentulism (lack of teeth). Poorer older adults were less likely to have teeth than those above the poverty threshold (46% compared to 27%) (Federal Interagency Forum, 2004). Glasses, hearing aids, and dentures can be difficult to obtain for financial reasons: They are expensive and they are not covered services under Medicare. Thus, many older adults may not possess these assistive devices, or may have out-of-date or ill-fitting devices, which can affect cognitive status (hearing aids and glasses), nutritional intake (dentures), and likelihood of falling (glasses).

Memory loss is not unusual in the older adult. Older men are more likely to experience moderate or severe memory impairment than older women. In 2002, 15% of men age 65 or older and 11% of women of the same age experienced moderate to severe memory impairment. At age 85 or older, nearly 33% of both women and men suffered from this impairment. In 2002, the proportion of people age 85 or older with moderate or severe memory impairment was 32% compared to 5% of people ages 65–69 (Federal Interagency Forum, 2004).

Many people feel that older age is highly correlated with disability. The age-adjusted proportion of people in the United States age 65 and older with chronic disabilities actually declined from 1984 to 1999. Due to the population growth, however, the actual numbers of older persons with chronic disabilities increased from 6.2 million in 1984 to 6.8 million in 1999. Older women reported more difficulties in physical functioning than older men. In 2002, 31% of older women reported that they were unable to perform at least one of five activities, compared to 18% of men (see **Figure 2-5**). Those age 85 or older had more physical limitations than those 65–74. Physical functioning is also somewhat related to race and ethnicity. Seventeen percent of non-Hispanic white males were unable to perform at least one physical activity, compared to 26% of non-Hispanic blacks and 22% of Hispanics. For women, 30% of non-Hispanic whites were unable to perform at least one activity, compared to 36% of non-Hispanic blacks and 29% of Hispanics (Federal Interagency Forum, 2004).

Figure 2-5 Medicare enrollees with limited function, 1991 and 2002.



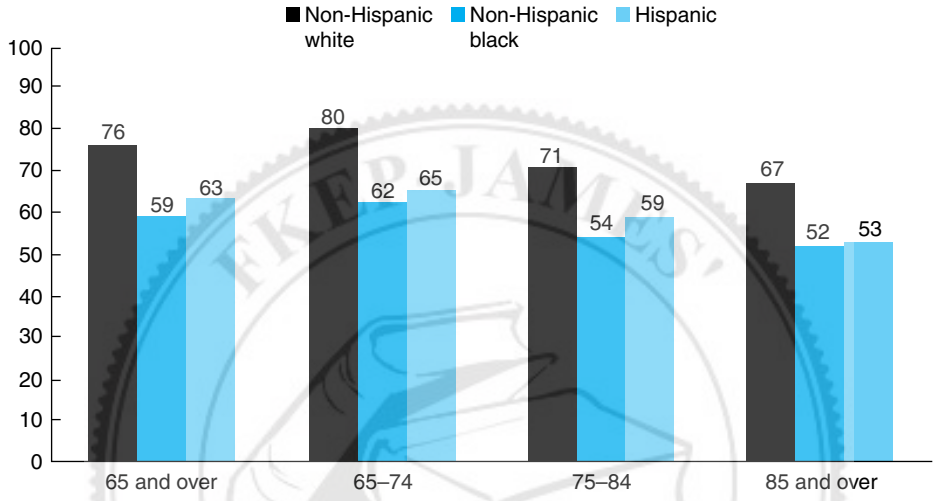
Source: Federal Interagency Forum on Aging-Related Statistics. November 2004. *Older Americans 2004: Key indicators of well-being*. Washington, DC: U.S. Government Printing Office. Retrieved May 27, 2005, from http://www.agingstats.gov/chartbook2004/default.htm

Good Health in Aging?

Feeling depressed about aging and the aged? Although the statistics can sound grim, in actuality, aging is enjoyed by the vast majority of seniors. More than 72% of seniors report having good to excellent health (see **Figure 2-6** and **Table 2-3**). The number of seniors living in nursing homes declined from 5.2% in 1990 to 4.5% in 2000. Only 18.2% of those age 85 and older lived in nursing homes in 2000, compared to 24.5% in 1990. In 2000, 1 out of every 5,578 people was 100 years of age or older (U.S. Census Bureau, 2001). Older adults in the United States are, by and large, active and healthy.

Figure 2-6 Persons 65+ reporting good to excellent health, 2000–2002.

Population of people age 65 and over who reported having good to excellent health, by age group and race and Hispanic origin, 2000–2002.



Note: Data are based on a 3-year average from 2000–2002. People of Hispanic origin may be of any race.
Reference population: These data refer to the civilian noninstitutionalized population.
Source: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey.

Source: Federal Interagency Forum on Aging-Related Statistics. November 2004. *Older Americans 2004: Key indicators of well-being*. Washington, DC: U.S. Government Printing Office. Retrieved May 27, 2005, from http://www.agingstats.gov/chartbook2004/default.htm

Aging in the United States

Patterns of aging in the United States have changed throughout the years. From 1650 to 1850, older Americans made up less than 2% of the population (Fleming, Evans, & Chutka, 2003). Old age in those times was considered to start at 60 years of age. In colonial times, elders were greatly respected. They were given the best seats in church. Puritans taught youth how to behave toward their elders (Egendorf, 2002). By 1870, older adults made up 3% of the U.S. population, and only 0.37% were over the age of 80. Some older adults lived with nuclear families and were treated with great respect. Among the upper classes, the older adults tended to control the family's land and wealth, thus maintaining authority over the family. Poor people in those times often did not live to old age—old age was a privilege of the rich. The elderly poor were seen as a burden on society, so if old age was attained by a poor person, it was accompanied by derision and scorn from other citizens (Fleming, Evans, & Chutka, 2003).

Youth came to be increasingly valued during the American Revolution. Older adults

Table 2-3 Persons 65+ Reporting Good to Excellent Health, 1994–1996

Percentage of Persons Age 65 or Older Who Reported Good to Excellent Health, By Age Group, Sex, and Race and Hispanic Origin, 1994 to 1996

	All Persons	Non-Hispanic White	Non-Hispanic Black	Hispanic
Total				
65 or Older	72.2	74.0	58.4	64.9
Men				
65 or Older	72.0	73.5	59.3	65.4
65 to 74	74.6	76.3	61.6	68.7
75 to 84	68.3	69.4	56.4	59.7
85 or Older	65.0	67.3	45.0	50.9
Women				
65 or Older	72.4	74.3	57.8	64.6
65 to 74	75.2	77.5	59.3	68.5
75 to 84	69.8	71.7	55.3	59.3
85 or Older	65.1	66.4	56.0	55.1

Note: Data are based on a 3-year average from 1994 to 1996. Hispanics may be of any race.
Reference population: These data refer to the civilian noninstitutional population.
Source: National Health Interview Survey, www.aoa.gov/prof/Statistics/minority_aging/facts_minority_aging.asp

declined in status. Fashion favored a youthful look, and clothing flattered the younger frame. Claimed ages in the census drifted downward, because people did not want to acknowledge their actual age. Terms such as "old fogey," "codger," and "geezer" came into being. Retirement from public office became mandatory at age 60 or 70 in many states (Egendorf, 2002; Fleming, Evans, & Chutka, 2003).

By the end of the 19th century, age stratification was prevalent in American life. Activities like school attendance, marriage, and retirement became based on age. By the start of the 20th century there were increasing numbers of older adults. Cultural focus shifted to business, medicine, and scientific advances. Older adults were devalued (Fleming, Evans, & Chutka, 2003).

Throughout history, old age has often been associated with lack of income and dependency on others. Poverty was greater in the southern states, especially among widows and blacks. Immigrants and blacks were the least prepared for the lack of income after retirement. Here is a quote from a former slave:

> *When my mother became old, she was sent to live in a lonely log-hut in the woods. Aged and worn out slaves, whether men or women, are commonly so treated. No care is taken of them, except, perhaps, that a little ground is cleared about the hut, on which the old slave, if able, may raise a little corn. As far as the owner is concerned, they live or die as it happens; it is just the same thing as turning out an old horse. (Fleming, Evans, & Chutka, 2003)*

Harriet Jacobs (1861) noted:

> *Slaveholders have a method, peculiar to their institution, of getting rid of old slaves, whose lives have been worn out in their service. I knew an old woman, who for seventy years faithfully served her master. She had become almost helpless, from hard labor and disease. Her owners moved to Alabama, and the old black woman was left to be sold to any body who would give twenty dollars for her.*

There were no national or state social supports for the poor in early America. Rather, the townships assisted the poor. In some communities, the rising taxes needed for relief of the poor led the communities to rid themselves of the poor by auctioning them off to farms for labor. Some communities even denied refuge to nonresidents, forcing the elderly to go from town to town in search of assistance. Citizens often divided the poor into two categories: the "worthy poor" who were unable to support themselves because of illness, disability, or old age, through no fault of their own, and the immoral, lazy, alcoholic poor. The elderly who had failed to save for their older years were also deemed by some to be unworthy of assistance by the community (Fleming, Evans, & Chutka, 2003; The Poorhouse Story, 2005). The poor were often sent to poorhouses. Poorhouses, which were warehouses for the old, insane, widowed, unmarried mothers, criminals, and drunks, were often filthy and unsafe. Physical abuse, lack of waste facilities, rats, and poor food made poorhouses dangerous places for the elderly, yet the poor elderly often ended up supported by the community and placed in the poorhouse.

Military pensions were initiated by the U.S. government in 1861. In 1904, President Theodore Roosevelt established old age as a disability. By 1910, 25% of the elderly U.S. population (Northern white soldiers and their widows) was receiving military pensions. Military pensions accounted for 43% of federal expenditures. This first pension system did not last—it dissolved after supporting the last Union veterans and their families (Fleming, Evans, & Chutka, 2003).

After the Civil War, elderly blacks worked as sharecroppers or became dependent upon their extended families. Black, white, and Hispanic tenant farmers worked well into their old age, lacking the education and resources to do otherwise. Older blacks migrated to the cities as the mechanical cotton picker forced them from their land. Those who did not migrate to the cities suffered ever worsening poverty (Fleming, Evans, & Chutka, 2003).

By 1900, poorhouses had changed into old-age homes. The costs of old-age homes became a burden for many counties, so in these counties elders were transferred to state-funded mental institutions. Charitable homes came into being, run by religious organizations, benevolent societies, and ethnic organizations. For-profit homes also developed, serving the chronically ill or disabled. Standards and oversight on all of these facilities was minimal (Fleming, Evans, & Chutka, 2003).

By the 1920s, the elderly population in the United States was increasingly seen as obsolete. The workplace denigrated older workers, seeing them as less productive and with too few attributes for working in the factories. Older workers were more likely to be injured on the job. Unions pushed for older workers to leave to make room for younger workers. Firms began to introduce mandatory retirement. Persons over 45 years of age began to have trouble finding work. Older workers suddenly found themselves

without work, health insurance, unemployment insurance, or retirement savings (Fleming, Evans, & Chutka, 2003).

The 1920s also brought the fall of the stock market and inflation, and led to the Great Depression of the 1930s. In 1920, 25% of older adults were impoverished. This increased to 30% before the Depression, to 50% in 1935, and to 66% by 1940 (Fleming, Evans, & Chutka, 2003). There was mass unemployment, and poor families could no longer afford to support their elders. Old people became dependent upon local and state governments for support.

Franklin Roosevelt signed the Social Security Act in 1935. This act provided income assistance for the elderly. Roosevelt's purpose was to enact a law that would give some measure of protection to the average U.S. citizen and his or her family against a poverty-ridden old age. But then, medical costs began to rise, forcing the elderly to again rely on the government for assistance. Medicare and Medicaid were signed into law in 1965 by President Johnson. Medicare and Medicaid offered a form of health insurance to those who previously had been seen as uninsurable families (Fleming, Evans, & Chutka, 2003).

County "poor farms" continued to exist. The Social Security Act of 1935, however, denied funding to these facilities. Private care homes flourished in the 1940s, again with few standards or oversights. Social pressures begat the for-profit long-term care industry. In the 1950s, a federal relationship flourished with the providers. By 1960, however, there was still a shortage of 500,000 long-term care beds in the United States. By 1997, nearly 4% of the U.S. population was being cared for in nursing homes. Currently, about 55% of persons 85 or older are impaired and require long-term care (Carbonell, 2005).

In 1880, 75% of men 65 or older were employed, being too poor to retire. They left work due to poor health or the inability to find work. With the emphasis on youth and the passage of the Social Security and Medicare/Medicaid bills, the number of older men who are employed has steadily dropped throughout the years. In 2003, less than 20% of men 65 or older worked full- or part-time (Carbonell, 2005).

Successful Aging

Some may consider successful aging an oxymoron. The idea of aging successfully may not be considered a possibility in our youth-obsessed society. The later years of life are most often considered a time of decline, disability, dissatisfaction, and loneliness. There is no consensus on a definition of successful aging. One view is to consider success as reaching the extreme in health and function at an advanced age. An alternative view is successfully adapting to changes in the aging process, while another perspective might be accomplishing individual goals or experiencing an ultimate feeling of well-being (vonFaber et al., 2001). It might be best to consider a combination of psychosocial and biomedical paradigms. A psychosocial view includes acceptance of death, life satisfaction, and feelings of well-being. A biomedical model is seen more as an avoidance of disease and disability. One must not look at successful aging as merely an avoidance of disease and disability, but as an achievement of a sense of autonomy, dignity, and absence of suffering (Glass, 2003).

It may be argued that all or a combination of views may describe success in reaching old age. A study conducted in Leiden, Netherlands, explored the meaning of successful aging in

those reaching 85 years of age. Data obtained from 599 elderly showed greater than 45% qualified as successful in the area of well-being while only 10% met criteria as successful in the area of functioning. In qualitative interviews, subjects identified successful aging as more of an adaptive process than reaching a state of being. Social function and feelings of well-being were valued more than physical and psychosocial well-being (vonFaber et al., 2001).

Numerous studies have been conducted on identifying characteristics of or predictors to old age. Two cohorts of adolescent boys (college students and core-city youth) were followed for 60 years or until death. Physical and psychosocial data were gathered intermittently over this time. Predictor variables at age 50 included uncontrollable factors and personally controlled factors that distinguished "happy-well" and "sad-sick" elderly. Protective factors included personally controlled factors of smoking, driving, exercise, weight, and education. Two additional factors considered modifiable included a stable marriage and maturity of defenses. An absence of alcohol and cigarette use before age 50 was most protective (Valliant & Mukamal, 2001). This would point to the concept that poor health in late life is not inevitable and modifiable risk factors contribute to successful aging.

A group of over 6,000 elderly Japanese men in Hawaii were studied over 28 years noting survival rates, development of clinical illness, and physical and cognitive functioning over time. Predictors of healthy aging were identified as low blood pressure, low serum glucose, not smoking cigarettes, and not being obese. Risk factors present at young and middle life are considered possible markers for late life morbidity and disability. This study further noted that changes made to these factors at any time, even in late life, could provide a benefit (Reed et al., 1998).

Centenarians

Centenarians make up the fastest growing segment of our population in the United States, with the over-85-year-olds making up the second fastest growing segment. Per the U.S. Census of 1990, 37,306 persons were classified as centenarians. Four in five centenarians are women, and 78% of this age group is non-Hispanic white. African Americans make up the second largest group at 16%. This correlates with 76% and 12% of the total population, respectively. In the next 40 years, the number of centenarians may reach 850,000, depending upon changes in life expectancy over these years. Hispanic and Asian Americans will share a greater percentage of this age group, with non-Hispanic whites nearing 55%.

Centenarians were found to be a predominately lower educated, more impoverished, widowed, and more disabled population as compared to other elderly cohorts (U.S. DHHS, 1990). The lower education of this cohort is not surprising considering the increase in levels of education noted over the span of the past century. The marital status of centenarians was overwhelmingly widowed, with 84% of 100-year-old women widowed as compared to 58% of men. Poverty status is more varied in this group and is dependent on race. Women generally were more likely to live in poverty in this age group. White centenarians are less likely than other races except Asian and Pacific Islanders to live in poverty. Disability, identified as having mobility and self-care limitations, was seen across all races. Not surprising, consistent with disability trends, all races of centenarians except American Indians, Eskimos, and Aleuts

Box 2-1 Resource List

Aging Statistics:

- Federal Interagency Forum on Aging-Related Statistics: http://www.agingstats.gov
- Administration on Aging: http://www.aoa.gov/prof/Statistics/statistics.asp
- Centers for Disease Control: http://www.cdc.gov/nchs/agingact.htm
- American Association of Retired Persons: http://www.aarp.org
- American Geriatrics Society: http://www.americangeriatrics.org
- Gray Panthers: http://www.graypanthers.org
- Merck Manual of Health and Aging: http://www.merck.com/pubs/mmanual_ha/sec1/ch03/ch03a.html

Online Journals:

- BMC Geriatrics: http://www.biomedcentral.com/bmcgeriatr
- Clinical Geriatrics: http://www.mmhc.com/cg/
- Geriatrics: http://www.geri.com/geriatrics/
- Geriatrics and Aging: http://www.geriatricsandaging.com
- WPA Slave Narratives: http://mshistory.k12.ms.us/features/feature60/slavenarratives.htm
- Estimate your longevity potential by accessing the Life Expectancy Calculator at: www.livingto100.com

were noted to be not living alone. The increased likelihood of living in a nursing home at this age was noted in all race categories.

The New England Centenarian study is a population-based study conducted within the New England area. The researchers noted a surprising heterogeneity in this group including a wide range of economic status, educational attainment, racial background, and origin of birth. Physical status varied widely as well. Fifteen percent of centenarians in this study were still living independently at home while 50% lived in nursing homes and the remainder lived with family. Three quarters of the study group suffered from some form of cognitive impairment. Health histories noted 95% of subjects enjoyed unimpaired health well into their ninth decade (Perls et al., 1999). Most notable in this study is the observation that the older one gets, the healthier one has been. It is suspected the centenarians have not necessarily survived disease but have avoided chronic/acute diseases, successfully navigating through obstacles and the physical/psychosocial challenges of their lives (Griffith, 2004).

Secrets of Aging

Why do some people live longer than others? Why is there such a discrepancy in functionality at very old age? As noted previously, several factors may contribute to reaching old age. Lifestyle choices including diet, exercise, socialization, and coping with stress play a large part. Genetics also play a role, especially in those surviving over the age of 80. Lifestyle changes can maximize the genetic potential, but to attain the age of 100 requires a special genetic makeup. This is seen in a study comparing people with siblings who lived to 100 to people (the same age as the other group) whose siblings died at age 73 (average life

expectancy of the late 1800s). The centenarian siblings were 3.5 times more likely to reach 80 and 4 times more likely to reach 90 years. These centenarian siblings were noted to weigh less, take fewer medications, and have fewer chronic diseases (e.g., heart disease, hypertension). The impact of genetic makeup vs. familial exposure to diet and exercise practices or longevity in general is not yet known.

A goal of the national health initiative, Healthy People 2010, is to increase quality and extend years of healthy life. A shift in attitudes by society, including health professionals, is needed to ensure this is accomplished. Dispelling myths and correcting stereotypes of the aged is a starting point (**Figure 2-7**). A positive view of aging as a normal process not necessarily including illness and disease is needed. Improved insight by Americans to the benefits of successful aging may decrease the feelings of denial and foreboding when faced with this milestone (Gavan, 2003).

Figure 2-7 The majority of people are healthy, active, and continue to be engaged in society after retirement.

Source: © Photodisc.

Critical Thinking Exercises

1. You will be one of the nurses caring for the baby boomers as they age. How will the prevalence of aged patients affect your nursing practice? What are the implications for your ongoing nursing education?
2. Healthful living becomes ever more important to prevent the chronic diseases of the aged. Fewer chronic diseases in the aged could mean that more health care services are available for those without chronic diseases. What is healthful living? What will your role be in promoting healthful living to your patients? Should nurses be responsible for promoting healthful living when they could be caring for sick patients?
3. The health care of the baby boomers will likely be affected by changes in Social Security, Medicare, and Medicaid. What implications does this have for your nursing practice? How might you address this issue as a nurse? How might you address this issue as a citizen?
4. The population of the United States is becoming ever more ethnically and culturally diverse. What health care issues can you foresee as this ethnically diverse population ages?
5. Think about older celebrities in the United States and abroad, and compare your thoughts about them to your thoughts about older people in general. Do you have different thoughts and feelings about Sean Connery than you do about a nursing home patient? How about those celebrities who are growing older–Cher, The Rolling Stones, Paul McCartney, Clint Eastwood, Chuck Norris? Compare and contrast a well-known senior celebrity with an aged patient you have recently met.

Personal Reflections

The aging of America will affect you both personally and professionally. Government resources will become more and more strained as the baby boomers become elders and begin to use these resources. Medicare, Medicaid, and Social Security may not exist as we know them. There will be fewer beds available in both acute and chronic care facilities to care for the growing aged population. There may not be enough geriatric specialty physicians and nurses to care for the vast numbers of older adults. How could these circumstances affect you and your family? What are your personal plans for your own aging? Have you started to save money for retirement? Are you living a healthy lifestyle, eating "right," and exercising? Are you or your children overweight? Do you smoke or drink alcohol excessively? Are you ready to become involved in the political process so that your opinion is heard?

Glossary

Baby boomers: A large group of people born between 1946 and 1964, in the time after the second World War.

Centenarian: Someone who is 100 years of age or older.

Chronic disease: A disease that is ongoing or recurring. Some types of cancer, as well as AIDS, have recently been designated as chronic diseases.

Cohort: A group of people with a similar characteristic, such as age or exposure to toxic chemicals, who are studied over time.

Demographic tidal wave: A term that describes the baby boomers. A large group about to "crash" into the resources of the United States.

Elderly: Usually described as those persons age 65 and over.

Foreign-born: Born outside of the United States; not a U.S. citizen at birth.

Graying of America: Similar to the aging of America.

Native-born: A U.S. citizen at birth.

Older adult: Age 65 or older.

Oldest old: Age 85+.

Pig in a python: Another descriptor of the baby boomers, as if they were a large lump inside a snake that is slowly moving along toward the tail. In other words, a bulge in population moving slowly through time.

Seniors: Age 65+.

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Chapter 3

Theories of Aging

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LEARNING OBJECTIVES

At the end of this chapter the reader will be able to:

1. Identify the major theories of aging.
2. Compare the similarities and differences between biological and psychosocial theories.
3. Describe the process of aging using a biological and a psychosocial perspective.
4. Analyze the rationale for using multiple theories of aging to describe the complex phenomenon of aging.
5. Describe a general theoretical framework, taken from all of the aging theories, that will assist nurses in making clinical decisions in gerontology.

KEY TERMS

- Apoptosis
- Free radicals
- Immunomodulation
- Lipofuscin
- Melatonin
- Mitochondria
- Nonstochastic theories
- Reactive oxygen species (ROS)
- Senescence
- Stochastic theories of aging
- Telomerase
- Telomere

From the beginning of time, the elusive phenomenon of preserving youth has been a topic of discussion in science, health care, technology, and everyday life. Is there anyone who would not be interested in knowing how the human organism ages? Doesn't everyone want to live a long and healthy life? There are few who would not want to see what the future holds for our bodies and minds; even more curiosity surrounds what advances have been made or will possibly be made to alter and slow the aging process. Understanding what knowledge theories of aging have generated and reviewing the validity of these findings and how they impact evolution and scientific advances is a first step toward understanding the mystery of aging. Troen (2003) suggests: "The beneficial paradox may be that the maximum lifespan potential of humans may have been achieved, in part, due to our ability to grow old" (p. 5).

Dickoff and Wiedenbach (1968) assert that for theories to be useful in a practice discipline, they must be specific enough to guide nursing care of select populations in a given setting. The complex needs of older adults include declining health and functioning that may require moving to more supportive environments. Psychological challenges facing older adults include dealing with social and economic losses, finding a meaningful life after retirement, and contemplating death. Cultural, spiritual, regional, socioeconomic, educational, and environmental factors as well as health status impact older adults' perceptions and choices about their health care needs. Theories that can effectively guide nursing practice with older adults must be comprehensive yet consider individual differences. According to Haight and colleagues, "a good gerontological theory integrates knowledge, tells how and why phenomena are related, leads to prediction, and provides process and understanding. In addition, a good theory must be holistic and take into account all that impacts on a person throughout a lifetime of aging" (Haight, Barba, Tesh, & Courts, 2002, p. 14).

Since the early 1950s, sociologists, psychologists, and biologists have proposed theories of aging. Although there is increased emphasis in the nursing literature on issues regarding the growing elderly population, little work has been done to develop discipline-specific aging theories. The purpose of this chapter is to review the chronological development of biopsychosocial aging theories, the evidence supporting or refuting these theories, and their application to nursing practice. CINAHL, the National Library of Medicine, the Web of Science, PsycINFO, and Sociological Abstracts databases were reviewed to assess support for and clinical application of the theories of aging.

Psychosocial Theories of Aging

The earliest theories on aging came from the psychosocial disciplines (**Table 3-1**). Psychosocial theories attempt to explain aging in terms of behavior, personality, and attitude change. Development is viewed as a lifelong process characterized by transitions. Psychological theories are concerned with personality or ego development and the accompanying challenges associated with various life stages. How mental processes, emotions, attitudes, motivation, and personality influence adaptation to physical and social demands are central issues.

Sociological theorists consider how changing roles, relationships, and status within a culture or society impact the older adult's ability to adapt. Societal norms can affect how individuals envision their role and function within that

Table 3-1 Psychosocial Theories of Aging

Theory	Description
Sociological Theories	Changing roles, relationships, status, and generational cohort impact the older adult's ability to adapt.
Activity	Remaining occupied and involved is necessary to a satisfying late-life.
Disengagement	Gradual withdrawal from society and relationships serves to maintain social equilibrium and promote internal reflection.
Subculture	The elderly prefer to segregate from society in an aging subculture sharing loss of status and societal negativity regarding the aged. Health and mobility are key determinants of social status.
Continuity	Personality influences roles and life satisfaction and remains consistent throughout life. Past coping patterns recur as older adults adjust to physical, financial, and social decline and contemplate death. Identifying with one's age group, finding a residence compatible with one's limitations, and learning new roles postretirement are major tasks.
Age stratification	Society is stratified by age groups that are the basis for acquiring resources, roles, status, and deference from others. Age cohorts are influenced by their historical context and share similar experiences, beliefs, attitudes, and expectations of life course transitions.
Person-Environment Fit	Function is affected by ego strength, mobility, health, cognition, sensory perception, and the environment. Competency changes one's ability to adapt to environmental demands.
Gerotranscendence	The elderly transform from a materialistic/rational perspective toward oneness with the universe. Successful transformation includes an outward focus, accepting impending death, substantive relationships, intergenerational connectedness, and unity with the universe.
Psychological Theories	Explain aging in terms of mental processes, emotions, attitudes, motivation, and personality development that is characterized by life stage transitions.
Human needs	Five basic needs motivate human behavior in a lifelong process toward need fulfillment.
Individualism	Personality consists of an ego and personal and collective unconsciousness that views life from a personal or external perspective. Older adults search for life meaning and adapt to functional and social losses.
Stages of personality development	Personality develops in eight sequential stages with corresponding life tasks. The eighth phase, integrity versus despair, is characterized by evaluating life accomplishments; struggles include letting go, accepting care, detachment, and physical and mental decline.
Life-course/lifespan development	Life stages are predictable and structured by roles, relationships, values, and goals. Persons adapt to changing roles and relationships. Age group norms and characteristics are an important part of the life course.
Selective optimization with compensation	Individuals cope with aging losses through activity/role selection, optimization, and compensation. Critical life points are morbidity, mortality, and quality of life. Selective optimization with compensation facilitates successful aging.

society, and thus impact role choices as well as how roles are enacted. There has been a large redefinition of the role of women in the United States since the 1960s. Such cohort or generational variables are a key component of sociological theories of aging.

Sociological Theories of Aging

Activity Theory

Sociological theorists have attempted to explain older adult behavior in relationship to society with such concepts as disengagement, activity, and continuity. One of the earliest theories addressing the aging process was begun by Havighurst and Albrecht in 1953 when they discussed the concept of activity engagement and positive adaptation to aging. From studying a sample of adults, they concluded that society expects retired older adults to remain active contributors. Activity theory was conceived as an actual theory in 1963 and purports that remaining occupied and involved is a necessary ingredient to satisfying late-life (Havighurst, Neugarten, & Tobin, 1963). The authors do not qualify the activity characteristics that are most directly linked to life satisfaction. Havighurst and Albrecht associate activity with psychosocial health and suggest activity as a means to prolong middle age and delay the negative effects of old age. An assumption of this theory is that inactivity negatively impacts one's self-concept and perceived quality of life and hastens aging.

Arguments against this point of view are that it fails to consider that activity choices are often constrained by physical, economic, and social resources. Furthermore, roles assumed by older adults are highly influenced by societal expectations (Birren & Schroots, 2001). Maddox (1963) suggests, however, that leisure time presents new opportunities for activities and roles such as community service that may be more consistent with these limitations. A second criticism of activity theory is the unproven assertion that continued activity delays onset of the negative effects of aging.

Despite these criticisms, the central theme of activity theory, that remaining active in old age is desirable, is supported by research. Lemon and colleagues found a direct relationship between role and activity engagement and life satisfaction among older adults (Lemon, Bengston, & Peterson, 1972). The authors also observed that the quality of activities, as perceived by older adults, is more important than the quantity. Other investigators add that informal activities such as meeting friends for lunch or pursuing hobbies through group activities are more likely to improve life satisfaction than formal or solitary activities (Longino & Kart, 1982). In a more recent study of older Americans, participation in shared tasks was an important predictor of life satisfaction, particularly among retirees (Harlow & Cantor, 1996). Successful aging means being capable of doing activities that are important to the older adult despite limitations (Schroots, 1996).

Disengagement Theory

In stark contrast to activity theorists, sociologists Cumming and Henry (1961) assert that aging is characterized by gradual disengagement from society and relationships. The authors contend that this separation is desired by society and older adults, and serves to maintain social equilibrium. Persons are freed from social responsibilities and gain time for internal reflection, while the transition of responsibility from old to young promotes societal functioning

without interruption from lost members. Diminishing social contacts lead to further disengagement in a cyclical process that is systematic and inevitable. The outcome of disengagement is a new equilibrium that is ideally satisfying to both the individual and society.

The emphasis this theory places on social withdrawal is challenged by later theorists who contend that a key element of life satisfaction among older adults appears to be engagement in meaningful relationships and activities (Baltes, 1987; Lemon, Bengston, & Peterson, 1972; Neumann, 2000; Schroots, 1996). Others contend that the decision to withdraw varies across individuals and that disengagement theory fails to account for differences in sociocultural settings and environmental opportunities (Achenbaum & Bengtson, 1994; Marshall, 1996). Rapkin and Fischer (1992) found that demographic disadvantages and age-related transitions were related to a greater desire for disengagement, support, and stability. Elders who were married and healthy were more likely to report a desire for an energetic lifestyle. Cumming and Henry's notion of a necessary fit between society's needs and older adult activity is supported, however (Back, 1980; Birren & Schroots, 2001; Riley, Johnson, & Foner, 1972). Until recently, Social Security laws placed economic barriers against retirement before the mid 60s, but as years of healthy life expectancy increase, society is reframing its notions about the capability of older adults to make valuable contributions (Uhlenberg, 1992). Many adults are working past retirement age or begin part-time work in a new field. Others are actively engaged in a variety of volunteer projects that may substantially benefit their communities. The many examples of what is now termed "successful aging" are challenging the common association of aging with disease.

Subculture Theory

Unlike activity theorists, Rose (1965) views older adults as a unique subculture within society formed as a defensive response to society's negative attitudes and the loss of status that accompanies aging. As in disengagement theory, Rose proposes that although this subculture segregates the elderly from the rest of society, older adults prefer to interact among themselves. Rose contends that in the United States, one's degree of health and mobility is more critical in defining social status than occupation, education, or income. Older adults have a social disadvantage regarding status and associated respect because of the functional decline that accompanies aging.

Rose's theory argues for social reform. Growing numbers of older adults make it necessary to pay more attention to the needs of this age group and are challenging the prevailing view of aging as negative, undesirable, burdensome, and lacking status. Questions are beginning to be asked about whether society should be more supportive of older adults in terms of the environment, health care, work opportunities, and social resources. The emphasis on whether societal or older adults' needs take precedence is beginning to shift in favor of older adults. McMullen (2000) argues that sociological theories need to more clearly address the diversity among older adults as well as the disparity from other age groups.

Continuity Theory

In the late 1960s, Havighurst and colleagues recognized that neither activity nor disengagement theories fully explain successful aging from a sociological point of view (Havighurst, Neugarten, & Tobin, 1968). Borrowing from psychology, they hypothesized that personality influences the roles one assumes, how roles are

enacted, and one's satisfaction with living. They explained their new perspective in the continuity theory, also known as development theory. Continuity theory suggests that personality is well-developed by the time one reaches old age and tends to remain consistent across the lifespan. Coping and personality patterns provide clues as to how an aging individual will adjust to changes in health, environment, or socioeconomic conditions, and what activities he or she will choose to engage in; thus, continuity theory acknowledges that individual differences produce varied responses to aging.

Havighurst and associates identified four personality types from their observations of older adults: integrated, armored-defended, passive-dependent, and unintegrated. Integrated personality types have adjusted well to aging, as evidenced by activity engagement that may be broad (reorganizers), more selective (focused), or disengaged. Armored-defended individuals tend to continue the activities and roles held during middle age, whereas passive-dependent persons are either highly dependent or exhibit disinterest in the external world. Least well-adjusted are unintegrated personality types who fail to cope with aging successfully. Havighurst (1972) later defined adjusting to physical, financial, and social decline; contemplating death; and developing a personal and meaningful perspective on the end of life as the tasks of older adulthood. Successful accomplishment of these tasks is evidenced by identifying with one's age group, finding a living environment that is compatible with physical functioning, and learning new societal roles postretirement.

Research suggests that self-perception of personality remains stable over time, and attitude and degree of adaptation to old age are related to life satisfaction. When older adults were asked how they thought they had changed over the years, almost all respondents thought they were still essentially the same person. Degree of continuity related to a more positive affect in these subjects (Troll & Skaff, 1997). In another study, Efklides and colleagues investigated effects of demographics, health status, attitude, and adaptation to old age on quality of life perceptions among older adults. The authors reported that positive attitude and adaptation to old age were associated with better perceptions about quality of life in this Greek sample (Efklides, Kalaitzidou, & Chankin, 2003). Critics of this theory, however, point out that the social context within which one ages may be more important than personality in determining what and how roles are played (Birren & Schroots, 2001).

Age Stratification Theory

In the 1970s, sociologists began to examine the interdependence between older adults and society, recognizing that aging and society are interrelated and cause reciprocal changes to individuals, age group cohorts, and society (Riley, Johnson, & Foner, 1972). Riley and colleagues observed that society is stratified into different age categories that are the basis for acquiring resources, roles, status, and deference from others in society. In addition, age cohorts are influenced by the historical context in which they live; thus, age cohorts and corresponding roles vary across generations. People born in the same cohort have similar experiences with shared meanings, ideologies, orientations, attitudes, and values as well as expectations regarding the timing of life course transitions. Individuals in different generations have different experiences that may cause them to age in different ways (Riley, 1994).

Age stratification transitioned aging theory from a focus on the individual to a broader con-

text that alerted gerontologists to the influence of cohort groups and the socioeconomic and political impact on how individuals age (Marshall, 1996). Uhlenburg (1996) borrowed from age stratification theory in developing a framework for understanding what social changes are needed to reduce the burden that aging cohorts place on society in terms of their care needs at different stages of later life.

Newsom and Schulz (1996) demonstrated that physical impairment is associated with fewer social contacts, less social support, depression, and lower life satisfaction. This finding suggests that social networks are an important element in how individuals age. Yin and Lai (1983) used age stratification theory to explain the changing status of older adults due to differences among cohort groups. Investigators studying age segregation versus integration in residential settings learned that outcomes were less favorable among settings with single cohort groups (Hagestad & Dannefer, 2001; Uhlenberg, 2000).

Person-Environment-Fit Theory

In addition to the broadened view of aging that emerged in the 1970s, another shift in aging theory in the early 1980s blended existing theories from different disciplines. Lawton's (1982) person-environment-fit theory introduced functional competence in relationship to the environment as a central theme. Functional competence is affected by multiple intrapersonal conditions such as ego strength, motor skills, biologic health, cognitive capacity, and sensori-perceptual capacity as well as external conditions posed by the environment. The degree of competency may change as one ages, affecting functional ability in relationship to environmental demands. Persons' ability to meet these demands is affected by their level of function and influences their ability to adapt to the environment. Those functioning at lower levels can tolerate fewer environmental demands.

Lawton's (1982) theory is useful for exploring optimal environments for older adults with functional limitations and identifying needed modifications in older adult residential settings. Building on Lawton's work, Wahl (2001) developed six models to explain relationships between aging and the environment home, institution, and relocation decision making. O'Connor and Vallerand (1994) used Lawton's theory to examine the relationship between long-term care residents' adjustment and their motivational style and environment. Older adults with self-determined motivational styles were better adjusted when they lived in homes that provided opportunities for freedom and choice, whereas residents with less self-determined motivational styles were better adjusted when they lived in high constraint environments. The authors conclude that their findings support the person-environment-fit theory of adjustment in old age.

Gerotranscendence Theory

One of the most recent aging theories is Tornstam's (1994) theory of gerotranscendence. This theory proposes that aging individuals undergo a cognitive transformation from a materialistic, rational perspective toward oneness with the universe. Characteristics of successful transformation include a more outward or external focus, accepting impending death without fear, an emphasis on substantive relationships, a sense of connectedness with preceding and future generations, and spiritual unity with the universe. Gerotranscendence borrows from disengagement theory but does not accept the idea that social disengagement is a necessary

Box 3-1 Research Highlight

Aim: This study investigated whether staff working with adults age 65 and older could recognize and interpret signs of gerotranscendence, and described how the staff addressed and cared for older people showing signs of gerotranscendence.

Methods: An interview guide was designed using Tornstam's (1994) three main elements of gerotranscendence: the cosmic level, the self, and social and individual relations. Thirty-four randomly selected nursing assistants, registered nurses, or occupational therapists working at a Swedish nursing home were interviewed. Interviews were audiotaped, transcribed, and coded using a constant comparison method to elucidate themes.

Findings: All staff noted signs of gerotranscendence, but they varied in which signs they recognized and how they were interpreted: pathological, invisible (rarely noticed), or normal. Staff interpretation was more consistent with activity theory, particularly with respect to older adults who preferred solitude over activity. Staff interpreted this preference as pathological.

Conclusion: An interpretative framework would facilitate staff understanding of introspective behavior displayed by older adults. A framework in which these behaviors are considered normal aspects of aging may impact staff attitudes and their approach to caregiving.

Source: Wadensten, B., & Carlsson, M. (2001). A qualitative study of nursing staff members' interpretations of signs of gerotranscendence. *Journal of Advanced Nursing, 36,* 635–642.

and natural development. Tornstam asserts that activity and participation must be the result of one's own choices that differ from one person to another. Control over one's life in all situations is essential for the person's adaptation to aging as a whole.

Gerotranscendence has been tested in recent studies. In an ongoing longitudinal study based on the principles of gerodynamics, Schroots (2003) is investigating how people manage their lives, cope with transformations, and react to affective-positive and negative life events. In nursing, Wadensten (2002) used the theory of gerotranscendence to develop guidelines for care of older adults in a nursing home. The results indicate that these guidelines may be useful for facilitating the process of gerotranscendence in nursing home residents.

Psychological Theories of Aging

Human Needs Theory

At the same time as activity theory was being developed, Maslow (1954), a psychologist, published the human needs theory. In this theory, Maslow surmised that a hierarchy of five needs motivates human behavior: physiologic, safety and security, love and belonging, self-esteem, and self-actualization. These needs are prioritized such that more basic needs like physiological functioning or safety take precedence over personal growth needs (love and belonging, self-esteem, and self-actualization). Movement is multidirectional and dynamic in a lifelong process toward need fulfillment. Self-actualization requires the freedom to express and pursue personal goals and be creative in an environment that is stimulating and challenging.

Although Maslow does not specifically address old age, it is clear that physical, economic, social, and environmental constraints

can impede need fulfillment of older adults. Maslow asserts that failure to grow leads to feelings of failure, depression, and the perception that life is meaningless. Since inception, Maslow's theory has been applied to varied age groups in many disciplines. Ebersole, Hess, and Luggen (2004) link the tasks of aging described by several theorists (Butler & Lewis, 1982; Havighurst, 1972; Peck, 1968) to the basic needs in Maslow's model. Jones and Miesen (1992) used Maslow's hierarchy to present a nursing care model for working with aged persons with specific needs in an attempt to relate all patient needs to universal, rather than exceptional, needs. The model is designed to be used by caregivers in residential settings.

Theory of Individualism

Like Maslow's theory, Jung's theory of individualism is not specific to aging. Jung (1960) proposes a lifespan view of personality development rather than attainment of basic needs. Jung defines personality as composed of an ego or self-identity with a personal and collective unconsciousness. Personal unconsciousness is the private feelings and perceptions surrounding significant persons or life events. The collective unconscious is shared by all persons and contains latent memories of human origin. The collective unconscious is the foundation of personality on which the personal unconsciousness and ego are built. Individual personalities tend to view life primarily either through the self or through others; thus, extroverts are more concerned with the world around them, whereas introverts interpret experiences from the personal perspective. As individuals age, Jung proposes that elders engage in an "inner search" to critique their beliefs and accomplishments. According to Jung, successful aging means acceptance of the past and an ability to cope with functional decline and loss of significant others. Neugarten (1968) supports Jung's association of aging and introspection and asserts that "interiority" promotes positive inner growth. Subsequent theorists also describe introspection as a part of healthy aging (Erikson, 1963; Havighurst, Neugarten, & Tobin, 1968).

Stages of Personality Development Theory

Similar to other psychologists' theories at the time, Erikson's theory focuses on individual development. According to Erikson (1963), personality develops in eight sequential stages that have a corresponding life task that one may succeed at or fail to accomplish. Progression to a subsequent life stage requires that tasks at prior stages must be completed successfully. Older adults experience the developmental stage known as "ego integrity versus despair." Erikson proposes that this final phase of development is characterized by evaluating one's life and accomplishments for meaning. In later years, Erikson and colleagues expanded upon his original description of integrity versus despair, noting that older adults struggle with letting go, accepting the care of others, detaching from life, and physical and mental decline (Erikson, Erikson, & Kivnick, 1986).

Several authors have expanded upon Erikson's work. Peck (1968) refined the task within Erikson's stage of ego integrity versus despair into three challenges: ego differentiation versus work role reoccupation, body transcendence versus body preoccupation, and ego transcendence versus ego preoccupation. Major issues such as meaningful life after retirement, the empty nest syndrome, dealing with the functional decline of aging, and contemplating one's mortality are consistent with Peck's conceptualization. Butler and Lewis (1982)

later defined the challenges of late life as adjusting to infirmity, developing satisfaction with one's lived life, and preparing for death, mirroring those tasks described earlier by Peck.

Erikson's theory is widely employed in the behavioral sciences. In nursing, Erikson's model is often used as a framework for examining the challenges faced by different age groups. In a recent study of frail elderly men and women, Neumann (2000) used Erikson's theoretical framework when asking participants to discuss their perceptions about the meaning of their lives. She found that older adults who expressed higher levels of meaning and energy described a sense of connectedness, self-worth, love, and respect that was absent among participants who felt unfulfilled. This finding is consistent with the potential for positive or negative outcomes described by Erikson and colleagues (1986) in his stage of "integrity versus despair."

Life-Course (Lifespan Development) Paradigm

In the late 1970s, the predominant theme of behavioral psychology moved toward the concept of "life course," in which life, although unique to each individual, is divided into stages with predictable patterns (Back, 1980). The significance of this shift was the inclusion of late as well as early life. Most theorists up to this point had focused primarily on childhood in their research. The substance of the life-course paradigm drew from the work of a European psychologist in the 1930s (Bühler, 1933). This new emphasis on adulthood occurred because of a demographic shift toward increasing numbers of older adults, the emergence of gerontology as a specialty, and the availability of subjects from longitudinal studies of childhood begun during the 1920s and 1930s (Baltes, 1987).

The central concepts of the life-course perspective blend key elements in psychological theories such as life stages, tasks, and personality development with sociological concepts such as role behavior and the interrelationship between individuals and society. The central tenet of life-course is that life occurs in stages that are structured according to one's roles, relationships, internal values, and goals. Individuals may choose their goals but are limited by external constraints. Goal achievement is associated with life satisfaction (Bühler, 1933). Individuals must adapt to changed roles and relationships that occur throughout life, such as getting married, finishing school, completing military service, getting a job, and retiring (Cunningham & Brookbank, 1988). Successful adaptation to life change may necessitate revising beliefs in order to be consistent with societal expectations. The life-course paradigm is concerned with understanding age group norms and their characteristics. Since the 1970s, the work of many behavioral psychologists such as Elder, Hareven, and Jackson has emerged from the life-course perspective, which remains a dominant theme in the psychology literature today. Selective optimization with compensation, discussed in the following section, is one example of a theory that emerged from the life-course perspective.

Selective Optimization with Compensation Theory

Baltes's (1987) theory of successful aging emerged from his study of psychological processes across the lifespan and, like earlier theories, focuses on the individual. He asserts that individuals learn to cope with the functional losses of aging

through processes of selection, optimization, and compensation. Aging individuals become more selective in activities and roles as limitations present themselves; at the same time, they choose those activities and roles that are most satisfying (optimization). Finally, individuals adapt by seeking alternatives when functional limits prohibit sustaining former roles or activities. As people age, they pass through critical life points related to morbidity, mortality, and quality of life. The outcome of these critical junctures may result in lower or higher order functioning that is associated with higher or lower risk, respectively, for mortality. Selective optimization with compensation is a positive coping process that facilitates successful aging (Baltes & Baltes, 1990).

Much of the recent research testing psychosocial theories centers on life-course concepts (Baltes, 1987; Caspi, 1987; Caspi & Elder, 1986; Quick & Moen, 1998; Schroots, 2003). In an ongoing longitudinal study called "Life-Course Dynamics," Shroots examines the self-organization of behavior over the course of life. He has found that life structure tends to be consistent over time and is influenced by life events and experiences. The relationship of life events to structure changes however, as we age. In an effort to outline the temporal and situational parameters of social life, Caspi (1987) developed a model for personality analysis using life-course concepts such as interactions among personality, age-based roles, and social transitions in a historical context. Life-course principles have also been used to examine gender differences in retirement satisfaction. Quick and Moen (1988) report that retirement quality for women is associated with good health, a continuous career, earlier retirement, and a good postretirement income. For men, good health, an enjoyable career, low work-role prominence, preretirement planning, and retiring voluntarily impacted satisfaction. The authors conclude that a gender-sensitive life-course approach to life transitions is essential.

Caspi and Elder (1986) criticized the life-course perspective of aging because it assumes that adaptation is governed by factors beyond the immediate situation. In a small sample of women, the authors examined how social and psychological factors experienced by older women in the 1930s relate to life satisfaction. They report relationships between intellect, social activity, and life satisfaction in older, working class women, but emotional health was a better predictor of life satisfaction among older women from higher class origins. Differences in how the Depression impacted adaptation to old age among women from distinct social classes are described. The authors conclude that the influence of social change on life course is intertwined with individual factors.

Biological Theories of Aging

The biological theories explain information regarding the physiologic processes that change with aging. In other words, how is aging manifested on the molecular level in the cell, tissues, and body systems; how does the body-mind interaction affect aging; what biochemical processes impact aging; and how do one's chromosomes impact the overall aging process? Does each system age at the same rate? Does each cell in a system age at the same rate? How does one's chronological age influence an individual who is experiencing a pathophysiological disease process—how does the actual disease influence the organism as well as the treatment, which

might include drugs, **immunomodulation**, surgery, or radiation? There are several theories that purport to explain aging at the molecular, cellular, organ, and system levels; however, no one theory has evolved. Both genetics and environment influence the multifaceted phenomenon of aging.

Some aging theorists divide the biologic theories into two categories:

1. A **stochastic** or statistical perspective, which identifies episodic events that happen throughout one's life that cause random cell damage and accumulate over time, thus causing aging
2. The **nonstochastic** theories that view aging as a series of predetermined events happening to all organisms in a timed framework.

Others believe aging is more likely the result of both programmed and stochastic concepts (Miquel, 1998). For example, there are specific programmed events in the life of a cell, but they also accumulate genetic damage to the **mitochondria** due to **free radicals** and the loss of self-replication as they age. The following discussion presents descriptions of the different theories in the stochastic and nonstochastic theory categories and also provides studies that support the various theoretical explanations.

Stochastic Theories

Studies of animals reflect that 35% of the effects of aging are due to genetics and 65% are environmentally induced (Finch & Tanzi, 1997). There is no set of statistics to validate that these same findings are true with human organisms. The following stochastic theories are discussed: free radical theory, Orgel/error theory, wear and tear theory, and connective tissue theory.

Free Radical Theory

Oxidative free radical theory postulates that aging is due to oxidative metabolism and the effects of free radicals, which are the end products of oxidative metabolism. Free radicals are produced when the body uses oxygen, such as with exercise. This theory emphasizes the significance of how cells use oxygen (Hayflick, 1985). Also known as superoxides, free radicals are thought to react with proteins, lipids, deoxyribonucleic acid (DNA), and ribonucleic acid (RNA), causing cellular damage. This damage accumulates over time and is thought to accelerate aging.

Free radicals are chemical species that arise from atoms as single unpaired electrons. Because a free radical molecule is unpaired it is able to enter reactions with other molecules, especially along membranes and with nucleic acids. Free radicals cause:

- Extensive cellular damage to DNA, which can cause malignancy and accelerated aging, due to oxidative modification of proteins that impact cell metabolism
- Lipid oxidation that damages phospholipids in cell membranes, thus affecting membrane permeability
- DNA strand breaks and base modifications that cause gene modulation.

This cellular membrane damage causes other chemicals to be blocked from their regularly friendly receptor sites, thus mitigating other processes that may be crucial to cell metabolism. Mitochondrial deterioration due to oxidants causes a significant loss of cell energy and greatly decreases metabolism. Ames (2004) and Harman (1994) suggest some strategies to assist in delaying the mitochondrial decay, such as:

- Decrease calories in order to lower weight.
- Maintain a diet high in nutrients.
- Use antioxidants.
- Minimize accumulation of metals in the body that can trigger free radical reactions.

Dufour and Larsson (2004) cite evidence of mitochondrial DNA damage accumulation and the aging process with mice.

With the destruction of membrane integrity comes fluid and electrolyte loss or excess depending on how the membrane was affected. Little by little there is more tissue deterioration. The older adult is more vulnerable to free radical damage because free radicals are attracted to cells that have transient or interrupted perfusion. Many older adults have decreased circulation because they have peripheral vascular as well as coronary artery disease. These diseases tend to cause heart failure that can be potentially worsened with fluid overload and electrolyte imbalance.

The majority of the evidence to support this theory is correlative in that oxidative damage increases with age. It is thought that people who limit calories, fat, and specific proteins in their diet may decrease the formation of free radicals. Roles of **reactive oxygen species (ROS)** are being researched in a variety of diseases such as atherosclerosis, vasospasms, cancers, trauma, stroke, asthma, arthritis, heart attack, dermatitis, retinal damage, hepatitis, and periodontitis (Lakatta, 2000). Lee, Koo, and Min (2004) report that antioxidant nutraceuticals are assisting in managing and, in some cases, delaying some of the manifestations of these diseases. Poon and colleagues (Poon, Calabrese, Scapagnini, & Butterfield, 2004) describe how two antioxidant systems (glutathione and heat shock proteins) are decreased in age-related degenerative neurological disorders. They also cite that free radical–mediated lipid peroxidation and protein oxidation affect central nervous system function. And now, for the first time, there is the possibility of investigating genetically altered animals to determine the impact of oxidative damage in aging (Bokov, Chaudhuri, & Richardson, 2004).

Examples of some sources of free radicals are listed in **Box 3-2**. In some instances, free radicals reacting with other molecules can form more free radicals, mutations, and malignancies. The free radical theory supports that as one ages, there is an accumulation of damage that has been done to cells and, therefore, the organism ages. Grune and Davies (2001) go so far as to describe the free radical theory of aging as "the only aging theory to have stood the test of time" (p. 41). They further describe how free radicals can generate cellular debris rich in lipids and proteins called lipofuscin which older adults have more of when compared to younger adults. It is thought that **lipofuscin**, or age pigment, is a nondegradable material that decreases lysosomal function, which in turn impacts an already disabled mitochondria (Brunk & Terman, 2002).

Box 3-2 Exogenous Sources of Free Radicals

Tobacco smoke
Pesticides
Organic solvents
Radiation
Ozone
Selected medications

Orgel/Error Theory

This theory suggests that, over time, cells accumulate errors in their DNA and RNA protein synthesis that cause the cells to die. Environmental agents and randomly induced events can cause error, with ultimate cellular changes. It is well known that large amounts of x-ray radiation cause chromosomal abnormalities. Thus, this theory proposes that aging would not occur if destructive factors such as radiation did not exist and cause "errors" such as mutations and regulatory disorders.

Hayflick (1996) does not support this theory, and explains that all aged cells do not have errant proteins, nor are all cells found with errant proteins old.

Wear and Tear Theory

Over time, cumulative changes occurring in cells age and damage cellular metabolism. An example includes the cell's inability to repair damaged DNA, as in the aging cell. It is known that cells in heart muscle, neurons, striated muscle, and the brain cannot replace themselves after they are destroyed by wear and tear. Researchers cite gender-specific effects of aging on adrenocorticotropic activity that are consistent with the wear and tear hypothesis of the ramifications of lifelong exposure to stress (Van Cauter, Leproult, & Kupfer, 1996). There is some speculation that excessive wear and tear due to exercising may accelerate aging by causing increased free radical production, which supports the idea that no one theory of aging is responsible but rather that a combination of factors are responsible for aging.

Studies of people with osteoarthritis suggest that cartilage cells age over time, and this degeneration is not due solely to strenuous exercise but also general wear and tear. It is pointed out that aged cells have lost the ability to counteract mechanical, inflammatory, and other injuries due to their **senescence** (Aigner, Rose, Martin, & Buckwalter, 2004).

Connective Tissue Theory

This theory is also referred to as cross-link theory, and it proposes that, over time, biochemical processes create connections between structures not normally connected. Several cross-linkages occur rapidly between 30 and 50 years of age. However, no research has been identified that could stop these cross-links from occurring. Elastin dries up and cracks with age. Hence, skin with less elastin (as with the older adult) tends to be dried and wrinkled. Over time, due to decreased extracellular fluid, numerous deposits of sodium, chloride, and calcium build up in the cardiovascular system. No clinical application studies were found to support this theory.

Nonstochastic Theories

The nonstochastic theories of aging are founded on a programmed perspective that is related to genetics or one's biological clock. Goldsmith (2004) suggests that aging is more likely to be an evolved beneficial characteristic and results from a complex structured process and not a series of random events. The following programmed theories are discussed: programmed theory, gene/biological clock, neuroendocrine, and immunologic/autoimmune theory.

Programmed Theory

As people age, more of their cells start to decide to commit suicide or stop dividing. The *Hayflick phenomenon,* or human fibroblast replicative senescence model, suggests that cells divide until

they can no longer divide, whereupon the cell's infrastructure recognizes this inability to further divide and triggers the **apoptosis** sequence or death of the cell (Sozou & Kirkwood, 2001). Therefore, it is thought that cells have a finite doubling potential and become unable to replicate after they have done so a number of times. Human cells age each time they replicate due to the shortening of the **telomere**. Telomeres are the most distal appendages of the chromosome arms. This theory of programmed cell death is often alluded to when the aging process is discussed. The enzyme **telomerase**, also called a "cellular fountain of youth," allows human cells grown in the laboratory to continue to replicate long past the time they normally stop dividing. Normal human cells do not have telomerase.

It is hypothesized that some cancer, reproductive, and virus cells are not restricted, having a seemingly infinite doubling potential, and are thus immortal cell lines. This is because they have telomerase, which adds back DNA to the ends of the chromosomes. One reason for the Hayflick phenomenon may be that chromosome telomeres become reduced in length with every cell division and eventually become too short to allow further division. When telomeres are too short, the gene notes this and causes the cell to die or apoptosize. Shay and Wright (2001) suggest that telomerase-induced manipulations of telomere length are important to study to define the underlying genetic diseases and those genetic pathways that lead to cancer.

Although it is unknown what initial event triggers apoptosis, it is generally acknowledged that apoptosis is the mechanism of cell death (Thompson, 1995). Increased cell apoptosis rates do cause organ dysfunction, and this is hypothesized to be the underlying basis of the pathophysiology of multiple organ dysfunction (MODS) (Papathanassoglou, Moynihan, & Ackerman, 2000).

Gene/Biological Clock Theory

This theory explains that each cell, or perhaps the entire organism, has a genetically programmed aging code that is stored in the organism's DNA. Slagboom and associates (Slagboom, Bastian, Beekman, Wendendorf, & Meulenbelt, 2000) describe this theory as comprising genetic influences that predict physical condition, occurrence of disease, cause and age of death, and other factors that contribute to longevity.

A significant amount of research has been done on circadian rhythms and their influence on sleep, **melatonin**, and aging (Ahrendt, 2000; Moore, 1997; Richardson & Tate, 2000). These rhythms are defined as patterns of wakefulness and sleep that are integrated into the 24-hour solar day (Porth, 2002). The everyday rhythm of this cycle of sleep-wake intervals is part of a time-keeping framework created by an internal clock. Research has demonstrated that people who do not have exposure to time cues such as sunlight and clocks will automatically have sleep and wake cycles that include approximately 23.5 to 26.5 hours (Moore, Czeisler, & Richardson, 1983). This clock seems to be controlled by an area in the hypothalamus called the suprachiasmatic nucleus (SCN) that is located near the third ventricle and the optic chiasm. The SCN, given its anatomical location, does receive light and dark input from the retina, and demonstrates high neuronal firing during the day and low firing at night. The SCN is connected to the pituitary gland, explaining the diurnal regulation of growth hormone and cortisol. Also due to the linkage with

the hypothalamus, autonomic nervous system, and brain stem reticular formation, diurnal changes in metabolism, body temperature, and heart rate and blood pressure are explained (Porth, 2002). It is thought that biological rhythms lose some rhythmicity with aging.

Melatonin is secreted by the pineal gland and is considered to be the hormone linked to sleep and wake cycles because there are large numbers of melatonin receptors in the SCN. Researchers have studied the administration of melatonin to humans and found a shift in humans' circadian rhythm similar to that caused by light (Ahrendt, 2000). The sleep-wake cycle changes with aging, producing more fragmented sleep, which is thought to be due to decreased levels of melatonin.

This theory indicates that there may be genes that trigger youth and general well-being as well as other genes that accelerate cell deterioration. Why do some people have gray hair in their late 20s and others live to be 60 or beyond before graying occurs? It is known that melanin is damaged with ultraviolet light and is the ingredient that keeps human skin resilient and unwrinkled. People who have extensive sun exposure have wrinkles earlier in life due to damage of collagen and elastin. But why, if we know that people have a programmed gene or genes that trigger aging, wouldn't we prevent the gene(s) from causing the problems they are intending to promote?

For example, hypertension, arthritis, hearing loss, and heart disease are among the most common chronic illnesses among older adults (Cobbs, Duthie, & Murphy, 1999). Each of these diseases has a genetic component to it. So if the health care profession can screen people when they are younger before they develop symptoms of target organ disease due to hypertension, loss of cartilage and hearing, and aspects of systolic and diastolic dysfunction, it is possible for people to live longer without experiencing the problems connected to these chronic illnesses.

This knowledge being acquired from the genome theory is greatly impacting the possibility of being able to ward off aging and disease. Studies of tumor suppressor gene replacement, prevention of angiogenesis with tumor growth, and regulation of programmed cell death are in process (Daniel & Smythe, 2003). Parr (1997) and Haq (2003) cite that caloric restriction extends mammalian life. By restricting calories there is a decreased need for insulin exposure, which consequently decreases growth factor exposure. Both insulin and growth factor are related to mammals' genetically determined clock controlling life span. So there is more evidence supportive of aging being influenced by key pathways such as the insulin-like growth factor path (Haq, 2003).

Neuroendocrine Theory

This theory describes a change in hormone secretion, such as with the releasing hormones of the hypothalamus and the stimulating hormones of the pituitary gland, which manage the thyroid, parathyroid, and adrenal glands, and how they influence the aging process. The following major hormones are involved with aging:

- Estrogen decreases thinning of bones, and when women age less estrogen is produced by the ovaries. As women grow older and experience menopause, adipose tissue becomes the major source of estrogen.
- Growth hormone is part of the process that increases bone and muscle strength. Growth hormone stimulates the release of insulin-like growth factor produced by the liver.

- Melatonin is produced by the pineal gland and is thought to be responsible for coordinating seasonal adaptations in the body.

There is a higher chance of excess or loss of glucocorticoids, aldosterone, androgens, triiodothyronine, thyroxine, and parathyroid hormone when the hypothalamus-pituitary-endocrine gland feedback system is altered. When the stimulating and releasing hormones of the pituitary and the hypothalamus are out of synch with the endocrine glands, an increase in disease is expected in multiple organs and systems. Of significance are the findings of Rodenbeck and Hajak (2001), who cite that with physiological aging and also with certain psychiatric disorders there is increased activation of the hypothalamus-pituitary-adrenal axis, which causes increased plasma cortisol levels. The increased cortisol levels can be linked with several diseases.

Holzenberger, Kappeler, and Filho (2004) cite that by inactivating insulin receptors in the adipose tissue of mice, the life span of the mice increases because less insulin exposure occurs. This further supports that the neuroendocrine system is connected to life span regulation. Thyagarajan and Felten (2002) suggest that as one ages there is a loss of neuroendocrine transmitter function that is related to the cessation of reproductive cycles as well as the development of mammary and pituitary tumors.

Immunologic/Autoimmune Theory

This theory was proposed 40 years ago and says that the normal aging process of humans and animals is related to faulty immunological function (Effros, 2004). There is a decreased immune function in the elderly. The thymus gland shrinks in size and ability to function. Thymus hormone levels are decreased at the age of 30 and are undetectable by the age of 60 (Williams, 1995). Involution of the thymus gland generally occurs at about 50 years. The elderly are more susceptible to infections as well as cancers. There is a loss of T-cell differentiation so that the body incorrectly perceives old, irregular cells as foreign bodies and attacks them.

There is also an increase in certain autoantibodies such as rheumatoid factor and a loss of interleukins. Some think that this change increases the chance of the older adult developing an autoimmune disease such as rheumatoid arthritis. Concurrently, resistance to tumor cells declines as one ages (Williams, 1995). Older adults are more prone to infection such as wound and respiratory infections, as well as to nosocomial infections if they are hospitalized.

Venjatraman and Fernandes (1997) cite that active and healthy older adults who participated in endurance exercises had a significantly increased natural killer cell function that, in turn, caused increased cytokine production and enhanced T cell function, which improves general well-being. In contrast, those not exercising see a loss of immunological function as they age. The idea that increased exercise causes new growth of muscle fibers is not new, but that it also causes an increased immunological function, sense of well-being, and general health is significant. So it is supportive of the fact that there is a combination of factors that influence the prevention or, in some cases, the promotion of aging. Also important to note is that there should be a balance of exercising and resting because overdoing exercise can lead to injuries, and this would support the wear and tear theory of aging.

Table 3-2 summarizes the major theories of aging originating from a biological perspective.

Table 3-2 Biological Theories of Aging

Theory	Description
Stochastic Theories	Based on random events that cause cellular damage that accumulates as the organism ages.
Free radical theory	Membranes, nucleic acids, and proteins are damaged by free radicals, which causes cellular injury and aging.
Orgel/error theory	Errors in DNA and RNA synthesis occur with aging.
Wear & tear theory	Cells wear out and cannot function with aging.
Connective tissue/ cross-link theory	With aging, proteins impede metabolic processes and cause trouble with getting nutrients to cells and removing cellular waste products.
Nonstochastic Theories	Based on genetically programmed events that cause cellular damage that accelerates aging of the organism.
Programmed theory	Cells divide until they are no longer able to, and this triggers apoptosis or cell death.
Gene/biological clock theory	Cells have a genetically programmed aging code.
Neuroendocrine theory	Problems with the hypothalamus-pituitary-endocrine gland feedback system cause disease; increased insulin growth factor accelerates aging.
Immunological theory	Aging is due to faulty immunological function, which is linked to general well-being.

It seems that no one theory fully describes the etiology of aging. However, the gene theory and free radical theory seem to have the most support.

Implications for Nursing

For many years, nursing has incorporated psychosocial theories such as Erikson's personality development theory into its practice (Erikson, 1963). Psychological theories enlighten us about the developmental tasks and challenges faced by older adults and the importance of finding and accepting meaning in one's life. From sociologists, nursing has learned how support systems, functionality, activity and role engagement, cohorts, and societal expectations can influence adjustment to aging and life satisfaction. These broadly generalized theories, however, lack the specificity and holistic perspective needed to guide nursing care of older adults who have varied needs and come from different settings and sociocultural backgrounds.

In a quest for a theoretical framework to guide caregiving in nursing homes, Wadensten (2002) and Wadensten and Carlsson (2003) studied 17 nursing theories that were generated from the 1960s to the 1990s and found that none of the theorists discussed what aging is nor did the theorists offer advice on how to apply their theory to caring for the older adult. Wadensten wrote that existing "nursing theories do not provide guidance on how to care for older people or on how to support them in the developmental process of aging. There is a need to develop a nursing care model that, more than contemporary theories, takes human aging into

consideration" (2002, p. 119). Others concur that nursing needs to develop more situation-specific theories of aging to guide practice (Bergland & Kirkevold, 2001; Haight, Barba, Tesh, & Courts, 2002; Miller, 1990; Putnam, 2002). Two new theories, the functional consequences theory (Miller, 1990) and the theory of thriving (Haight et al., 2002) are nurse authored and attempt to address this need.

Nursing Theories of Aging

Functional Consequences Theory

Functional consequences theory (Table 3-3) was developed to provide a guiding framework that would address older adults with physical impairment and disability (Miller, 1990). Miller's theory borrows from several nursing and non-nursing theories including functional health patterns; systems theory; King's (1981) conceptualization of person, health, environment, and the nurse-client transaction; Lawton's (1982) person-environment fit; and Rose and Killien's (1983) conceptual work defining risk and vulnerability. Miller asserts that aging adults experience environmental and biopsychosocial consequences that impact their functioning. The nurse's role is to assess for age-related changes and accompanying risk factors, and to design interventions directed toward risk reduction and minimizing age-associated disability. Nursing's goal is to maximize functioning and minimize dependency to improve the safety and quality of living (Miller).

Functional consequences theory assumes that quality of life is integrated with functional capacity and dependency needs, and that positive consequences are possible despite age-related limitations. In addition to those experiencing negative functional consequences, Miller (1990) applies her theory to highly functioning older adults as well as to adult caregivers. She distinguishes the focus and goal of nursing interventions in varied settings (inpatient, outpatient, acute or long-term care); thus, it can be used in many settings. Interventions are broadly interpreted as those of nurses, other health care providers, older adults, or significant others; therefore, this theory may be useful in other health care disciplines. This theory was used to create an assessment tool for the early detection of hospitalized elderly patients experiencing acute confusion and to prevent further complications (Kozak-Campbell & Hughes, 1996). Further testing is needed to determine the utility of the functional consequences theory in other settings.

Theory of Thriving

The theory of thriving (Haight et al., 2002) is based on the concept of failure to thrive and Bergland and Kirkevold's (2001) application of

Table 3-3 Nursing Theories of Aging

Theory	Description
Functional consequences theory	Environmental and biopsychosocial consequences impact functioning. Nuring's role is risk reduction to minimize age-associated disability in order to enhance safety and quality of living.
Theory of thriving	Failure to thrive results from a discord between the individual and his or her environment or relationships. Nurses identify and modify factors that contribute to disharmony among these elements.

Case Study 3-1

Mr. Ronald Dea, 64 years old, had been planning for many years to retire from his position as an accountant at a software company at his 65th birthday. Then his wife of 40 years died of lymphoma last year. He now finds that he only gets out of his house to work. He has let his racquetball membership, swimming club, and night out with his neighborhood friends slide. He finds he does not go out socially at all anymore except for visiting his two children and their families, who live out of town, when invited. He is no longer active in the Lions Club nor does he regularly attend his church where he and his wife used to be very involved.

Now he is deliberating whether to retire or not because he is aware that his work has become the only thing in his life. He is finding he does not have the energy he used to and that he is not excited about the weekend time he used to enjoy so much. He also has found he does not enjoy food shopping, so Mr. Dea generally buys his main meal at work and then snacks on crackers and cheese at night. He generally eats a donut or a bagel for breakfast. On the weekends, Mr. Dea stays in bed until noon and does not eat anything until night when he goes to the nearby fast food drive-in window to pick up fried chicken or has a pizza delivered.

He has not changed anything in his bedroom since his wife died nor removed any of his wife's belongings from the home. Mr. Dea has been delaying his regularly scheduled visits to his hematologist for management of his hemochromatosis. He has been gaining weight, approximately 14 pounds, since his wife was first diagnosed with cancer about $2\frac{1}{2}$ years ago. He has also started smoking a cigar just about every evening. It was after his nightly smoke when he was walking up the hill in his backyard one evening that he fell and fractured his hip.

Mr. Dea has just been discharged home from the rehabilitation center, and you are the visiting nurse assigned to him. He has planned judiciously for his retirement but has been afraid to prepare the paperwork. Mr. Dea confides in you that he wants to remain independent as long as possible. He shares his concerns with you and inquires what your opinion is of how he should proceed. One of his daughters is at his home for the next 2 weeks to assist him and is pushing him to retire and move in with her and her family.

Drawing from aging theory, what are some of the challenges you believe Mr. Dea is dealing with? What would you, given the knowledge you have learned regarding aging theories, recommend to Mr. Dea regarding retirement? Would you recommend he sell his house and move out of the town he has lived in for so many years? What other living arrangements might be conducive for Mr. Dea? Who would you suggest he and his daughter talk with regarding his everyday needs if he chooses to stay in his house during his convalescence? What are his priority needs for promoting his health? How would these be best managed? Use aging theory to support your responses.

thriving to the experience of well-being among frail elders living in nursing homes. They discuss the concept in three contexts: an outcome of growth and development, a psychological state, and an expression of physical health state. Failure to thrive first appeared in the aging literature as a diagnosis for older adults with vague symptoms such as fatigue, cachexia, and generalized weakness (Campia, Berkman, & Fulmer, 1986). Other disciplines later defined undernutrition, physical and cognitive dysfunction, and depression as its major attributes (Braun, Wykle, & Cowling, 1988). In their concept analysis of failure to thrive, Newbern and Krowchuk (1994) identified attributes under two categories: problems in social relatedness (disconnectedness and inability to find meaning in life, give of oneself or attach to others) and physical/cognitive dysfunction (consistent unplanned weight loss, signs of depression, and cognitive decline).

Haight and colleagues (2002) view thriving in a holistic, life span perspective that considers the impact of environment as people age. They assert that thriving is achieved when there is harmony between a person and his or her physical environment and personal relationships. Failure to thrive is due to discord among these three elements. Nurses caring for patients can use this theory to identify factors that may impede thriving and plan interventions to address these concerns.

Box 3-3 Resource List

End-of-Life Nursing Education Consortium (http://www.aacn.nche.edu/ELNEC/About.htm): The core curriculum in end of life consists of nine content modules with syllabus, objectives, student note-taking outlines, detailed faculty content outlines, slide copy, reference lists, and supplemental teaching materials available in hard copy and CD-ROM.

The John A. Hartford Foundation Institute for Geriatric Nursing (http://www.hartfordign.org): A wealth of resources including core curriculum content for educators in academic and practice settings including detailed content outlines, case studies, activities, resources, PowerPoint slides, an online Gerontological Nursing Certification Review Course, research support programs, best practice guidelines, consultation services, and geriatric nursing awards.

Mather LifeWays Institute on Aging (http://www.matherlifeways.com/re_researchandeducation.asp): Offers programs for faculty development (Web-based), long-term care staff, and family caregivers.

National Institute on Aging (www.niapublications.org): Free publications about older adults for health professionals and patients.

Toolkit for Nurturing Excellence at End-of-Life Transition (http://www.tneel.uic.edu/tneel.asp): A package for palliative care education on CD-ROM that includes audio, video, graphics, PowerPoint slides, photographs, and animations of individuals and families experiencing end-of-life transitions. An evidence-based self-study course on palliative care will soon be available for the national and international nursing community.

Conclusion

Both nursing theories contribute to our understanding of aging from the perspectives of thriving and functionality; however, neither encompasses all of the holistic elements (cultural, spiritual, geographic, psychosocioeconomic, educational, environmental, and physical) of concern to nursing. Until nursing has a comprehensive theoretical framework to guide its practice that is tested with diverse patients in varied settings, there remains much that can be useful from the theories of other disciplines. From the stochastic and programmed biological theories of aging, nurses can better manage nutrition, incontinence, sleep rhythms, immunological response, catecholamine surges, hormonal and electrolyte balance, and drug efficacy for older adults with chronic illnesses. Using psychosocial aging theories, nurses can assist both the older adult and his or her family in recognizing that the life they have lived has been one of integrity and meaning and facilitate peaceful death with dignity. Ego integrity contributes to older adults' well-being and reduces the negative psychological consequences that are often linked to chronic illness and older age. Finally, being cognizant of older adults' socioeconomic resources will assist the nurse and older adult in planning cost-effective best practices to improve symptom management and treatment outcomes.

Using knowledge gained from aging theories, nurses can assist people to:

- Use their genetic makeup to prevent co-morbidities
- Facilitate best practices for managing chronic illnesses
- Maximize individuals' strengths relative to maintaining independence
- Facilitate creative ways to overcome individuals' challenges
- Assist in cultivating and maintaining older adults' cognitive status and mental health.

In conclusion, aging continues to be explained from multiple theoretical perspectives. Collectively, these theories reveal that aging is a complex phenomenon still much in need of research. How one ages is a result of biopsychosocial factors. Nurses can use this knowledge as they plan and implement ways of promoting health care to all age groups. As in other disciplines, the state of the science on aging is rapidly growing within the nursing profession. Nursing is developing a rich body of knowledge regarding the care of older adults. Programs and materials developed by the Hartford Institute for Geriatric Nursing, the End of Life Nursing Care Consortium, the American Association of Colleges of Nursing, and the Mather Institute provide a strong foundation for developing and disseminating our current knowledge. Nursing research must continue to span all facets of gerontology so that new information will be generated for improved patient outcomes.

Box 3-4 Recommended Reading

Goldsmith, T. (2003). *The evolution of aging: How Darwin's dilemma is affecting your chance for a longer and healthier life.* Retrieved January 5, 2005, from http://www.azinet.com/aging.

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Critical Thinking Questions

1. Mrs. Smith, 72 years old and recently diagnosed with a myocardial infarction, asks why she should take an anticholesterol drug for her hyperlipidemia at her age. Why should she engage in the lifestyle changes her nurse is recommending?
2. Your 82-year-old patient, Rodney Whitishing, has been healthy most of his life and now is experiencing, for the second winter in a row, an extremely severe case of influenza. He has never taken a flu shot as a preventive measure because he felt he was very strong and healthy. Explain how you would discuss the older adult's immune system and why the elderly seem to be more vulnerable to influenza.
3. John, an 85-year-old man with emphysema, is brought to your clinic by his family because of increasing complaints about shortness of breath. John uses oxygen at home, but states that he is afraid to walk more than a few steps or show any emotion because he will become unable to get enough air. John tells you that he feels his life is not worth living. Using the theories of aging, how might you respond to this situation?

Personal Reflections

1. Develop a philosophy of how theories of aging can support or refute the idea of categorizing people in the young-old, middle-old, and old-old classifications according to chronological age. What other characteristics could be used to categorize people as they age? Give an example of how you would perceive a relative or friend of yours who is in the sixth or seventh decade of life.
2. Comparable to infant-child development stages, generate five or six stages of development for older adults to accomplish as they complete their work stage and begin their retirement era.
3. Using theories of aging with biological, psychological, and sociological perspectives, hypothesize how these frameworks influence the older adult's development.

Glossary

Apoptosis: A process of programmed cell death marked by cell shrinkage.

Free radicals: Chemical species that arise from atoms as single unpaired electrons.

Immunomodulation: Effects of various chemical mediators, hormones, and drugs on the immune system.

Lipofuscin: An undegradable material that decreases lysosomal function; age pigment.

Melatonin: A hormone produced by the pineal gland that is linked to sleep and wake cycles.

Mitochondria: Part of a cell that transforms organic compounds into energy.

Nonstochastic theories of aging: A series of genetically programmed events happening to all organisms with aging.

Reactive oxygen species: Short-lived, highly reactive products of mitochondrial oxidative metabolism that destroy proteins, lipids, and nucleic acids.

Senescence: The process of growing old.

Stochastic theories of aging: Random events occurring in one's life causing damage that accumulates with aging.

Telomerase: An enzyme that regulates chromosomal aging by its action on telomeres.

Telomere: Repeated sequences of DNA that protect the tips of the outermost appendages of the chromosome arms.

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Section 2

Communication (Competencies 3, 4)

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Chapter 4

Aging Changes That Affect Communication

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LEARNING OBJECTIVES

At the end of this chapter, the reader will be able to:

1. Identify sensorimotor, cognitive, and psychological changes associated with aging.
2. Understand the mechanisms behind changes in sensorimotor, cognitive, and psychological functioning of older adults.
3. Distinguish between normal aging-related changes and pathological ones.
4. Understand the impact that sensorimotor, cognitive, and psychological changes associated with aging have on communication with older adults.

KEY TERMS

- ADLs
- Alzheimer's disease
- Aphasia
- Cataracts
- Conductive problems
- Confabulation
- Crystallized intelligence
- Delirium
- Dementia
- Depression
- Diabetic retinopathy
- Dysarthria
- Fine motor movement
- Fluid intelligence
- Glaucoma
- Gross motor movement
- Gustation
- IADLs
- Macular degeneration
- Olfaction
- Presbycusis
- Sensorineural problems
- Somatosensory system
- Tinnitis
- Verbal apraxia
- Visual acuity

Communication is an important behavioral skill that allows us to survive in and interact with our world. Through our ability to communicate, we express our needs and wishes, understand others' needs and wishes, negotiate adversity, and convey our feelings to others. Losing our ability to communicate effectively compromises our ability to function independently. As an example, imagine yourself in a foreign train station trying to find a way to get to the nearest hotel. You are trying to ask for directions but no one understands what you say or even worse than that . . . you move your lips but there is no sound. You would be left to determine another way to reach your goal, but the method would be far more complicated than if you were simply able to say, "Where is the nearest hotel?" This example underscores the importance of communication, and how changes in the ability to communicate may require special adaptation and can be anxiety provoking.

Communication is composed of a number of physiological processes, specifically, listening, speaking, gesturing, reading, writing, touching, and moving. It also involves cognitive processes such as attention, memory, self-awareness, organization, and reasoning. In this chapter, we will provide: 1) an overview of the sensory modalities involved in communication, 2) an overview of the role of the brain in communication, and 3) information about normal and pathological changes associated with aging and their impact on communication.

Sensory Modalities Involved in Communication

We receive information through our senses. Approximately 70% of all sensory information comes through the eyes (Springhouse, 2001). Thus, vision has an important role in communication. In face-to-face interactions, we use visual information to make sense of the interaction. Visual information provides us important context with which to interpret the communication. For example, being asked to move to the other side of the street likely will be interpreted differently if conveyed by a neighbor rather than a police officer. Furthermore, gestures and other nonverbal behaviors, such as a smile, an eye blink, or tears, allow us to decipher the emotional tone of an interaction. In addition to the use of visual information in face-to-face interactions, we rely heavily on visual information in other modes of communication. Books, newspapers, television, computers, and traffic signs are all common modalities that use visual methods for communication.

Hearing is another prominent sense that is involved in the reception of communication. We receive auditory information through our ears. A major source of communication is the content of auditory verbal information that is conveyed in conversations as well as via radio, television, or computers. In addition, we heavily rely on nonverbal auditory information. For example, we pay attention to the physical properties of the sound, such as pitch (how high or low a tone sounds) and timber (the quality of the sound) that tell us whether a person is angry or whimsical, young or old, healthy or sick. Nonverbal auditory information also plays an important role in communication. For example, hearing a car engine tells us that a car is coming, or hearing a certain melody in a movie tells us that the killer may be approaching the scene.

Other sensory modalities may not seem as important for communication. However, touch may be used as a substitute for other senses. For example, a person with a poor sense of vision may rely on touch to "read" his or her environ-

ment. Light touch initiated by others can convey the presence of someone who cares for you. The chemical senses of smell (**olfaction**) and taste (**gustation**) also seem to be unrelated to communication. Yet, we give chocolate to our loved ones on Valentine's Day and wear our favorite perfume when we go out with people we like. When other sensory modalities are absent, olfaction and gustation might capture a greater role in our life, because they may serve as the major mechanisms of communication.

Movement provides us with important information about our environment. For some, movement combined with the sense of touch allows them to receive information from the environment. Orienting oneself toward the source of communication is yet another way in which movement improves our ability to receive information from our environment. Last, in addition to its role in the actual articulation of verbal information, movement allows us to convey meaning by the use of nonverbal gestures and facial expressions.

Speech is the primary form of communicating with our environment. Speech is a very complex process that requires sensory input, motor output to both facial and vocal muscles, and central processing that takes place in multiple brain locations (Beers & Berkow, 2004). Speech involves both articulation and pronunciation and is distinguished from language, which involves the actual selection of words and the integration of words into sentences. In contrast to speech, language can be either written or spoken as well as either verbal or nonverbal (Finlayson & Heffer, 2000). Cognitive issues such as those that occur with dementia, or psychological factors such as fear of expressing one's opinion, may also impact speech.

Last, disability (physical impairment) may not have a direct effect on our ability to communicate and may not result in a sensory deficit. However, it might result in other people modifying their style of communication towards disabled older adults and, thus, will be briefly discussed in this chapter.

The Role of the Brain in Communication

The brain has a major role in attending to new information, making sense of and organizing information, and deciding on a response. The information we receive through our senses is not an exact representation of the real world. Our nervous system is limited in its ability to receive information from the physical world. For example, our hearing is limited to frequencies of 20 to 20,000 hertz and our vision is limited to a wavelength of 400 to 700 nanometers. Thus, we may be completely oblivious to stimuli that exceed these physical characteristics. In addition, our brain is set to respond to change rather than to continuity and, thus, tends to adapt by responding at a slower rate after a stimulus is presented for a while. This may result in perceiving certain stimuli as more intense just because of their novelty. Last, we tend to perceive incomplete information as complete and recognizable, because this is more efficient, less ambiguous, and makes better sense for us (Atrens & Curthoys, 1978; Howard Hughes Medical Institute, 2005).

The cortex is a large, wrinkly sheet of neurons that covers the brain. The cortex contains all the sensory and motor information as well as our thoughts. Information that is perceived through our sensory system goes to the thalamus, a relay station in the center of our brain. It is then transferred via neurons into the sensory cortex. The sensory area of the cortex is located on a vertical strip near the center of the skull. Sensory information is represented on this strip

in relation to the sensitivity of each body part, and not in relation to its actual size. For example, the tongue is very sensitive and thus, captures a large area of the sensory cortex despite its relatively small size. From the sensory cortex, information is sent to higher-order parts of the brain, such as the forebrain. These areas integrate the sensory information and interpret it based on past experiences, overall arousal level, and the array of sensory information already available to us (Atrens & Curthoys, 1978; Howard Hughes Medical Institute, 2005).

When one or more sensory systems do not function, our brain compensates by relying on other sensory modalities for information. For example, Helen Keller lost her vision and hearing at 19 months of age. Yet, she was able to develop an extraordinary sense of touch that allowed her to communicate with the world (Howard Hughes Medical Institute, 2005). Although the brain is more adaptable at such a young age, even older adults may use one modality to replace other modalities that function inadequately. For example, an older adult who has lost the ability to see might be able to learn how to use touch to "read" books written in Braille. Similarly, in the case of neurodegenerative diseases such as **dementia**, when the brain's ability to understand information and to communicate verbally deteriorates, older adults may resort to alternative forms of communication.

Normal and Pathological Age-Related Changes That Affect Communication

Sensory changes are common with aging. The U.S. Census Bureau reported that of the 33 million noninstitutionalized elders over the age of 65 surveyed, 14% had some type of sensory deficit (Waldrop & Stern, 2003). This number increases with age, with 35% of people aged 85 and older reporting a sensory disability. We will now provide a discussion of aging-related changes in the sensory system as well as in cognitive and psychological functioning. Not all age-related changes are "normal" and expected. Some are the result of pathological processes that are more likely to take place at old age. Thus, for each sensory modality, we also will discuss pathological changes that are common in older adults. These will be followed by a discussion of the impact of these changes on communication. **Table 4-1** provides a concise summary of this section.

Vision

Typical Age-Related Changes in the Eye

The Lens. With age, the lens changes in color, becoming more yellowed or amber, and more opaque. This makes it difficult for the aging eye to distinguish colors in the blue-green hue range. The lens becomes flattened, denser, and less flexible (Gray, 1995), the result of which is that the lens's ability to accommodate (adjust focus) is compromised (Kline & Scialfa, 1996). These changes begin after the age of 40 and impact our ability to see certain colors, focus on objects, and so on.

The Iris and Pupil. Starting at the age of 50, the pupillary reflex responds more slowly, and the pupil does not dilate completely (the size of the pupil decreases), making it more difficult to see in lower light, thus older adults adapt to the dark less quickly. The pupil contracts less quickly as well, which makes it more difficult to deal with sudden illumination such as when walking from indoors into direct sunlight. By age 60, these

Table 4-1 Normal and Pathological Changes and Their Impact on Communication

Modality	Normal Changes	Pathological Changes	Impact on Communication
Vision	Changes in lens, pupil, and iris; results in poor visual acuity, presbyopia, and increased sensitivity to light and glare	Macular degeneration, diabetic retinopathy, glaucoma, senile cataracts, retinal detachment	Isolation, insecurity, decrease in exchange of communication, embarrassment, depression
Hearing	Conductive problems, sensorineural problems, presbycusis; results in loss in sensitivity to pitch with high-frequency consonants, poor word recognition	Total hearing loss Loss of low frequency tones	Isolation, limited communication with non-impaired
Speech and Language	Decreased respiration, overproduction of mucous/reduced saliva, loss of teeth, decreased elasticity and muscle tone; results in shaky and breathy voice, voice may sound tremulous, frequent attempts at throat clearing, changes in articulation, semantic errors	Dysarthria, verbal apraxia, aphasia, chronic obstructive pulmonary disease, mechanical ventilation, laryngectomy	Deficits vary dramatically but may result in difficulties producing language, difficulties in producing coherent and communication, or difficulties in understanding verbal communication
Touch	Reduction in number of receptors, reduction in blood flow; results in a reduction in tactile and vibration sensations and decreased sensitivity to warm or cold stimuli	Lack of tactile sensation Impaired proprioception	Use of the mouth to explore the quality of the objects; safety might be compromised
Movement	Due to decline in many sensory organs, cognitive functioning, and bodily strength; results in reduced velocity and accuracy and greater variability across individuals	Ataxia Bradykinesia Dystonia Rigidity Tremors Spasticity	Reduced ability to communicate nonverbal information, insecurity, loss of independence, increased risk of falls

(continues)

Table 4-1 Normal and Pathological Changes and Their Impact on Communication (continued)

Modality	Normal Changes	Pathological Changes	Impact on Communication
Cognitive	Decline in information processing speed, divided attention, sustained attention, visual-spatial tasks, short-term memory	Delirium, dementia; Alzheimer's disease	Depending on cognitive impairment, loss may result in complete disorientation and inappropriate response, difficulty finding words, depression, loss of insight, isolation, and impairment in ability to learn new information
Psychological	In general, older adults report levels of satisfaction that are similar to that of younger adults	Depression	Slowed response, lack of motivation, decrease in social activity

changes in the pupil and lens result in a tremendous reduction (70%) in the amount of light that reaches the retina (Pirkl, 1995).

Typical Vision Problems

Vision problems are some of the most common sensory deficits in older adults. Most people experience testable visual losses that are revealed during an examination, but are subtle and do not actually impair daily existence due to the person's ability to compensatorily adapt. The Lighthouse for the Blind (1995) conducted a national survey, "The Louis Harris Survey," to determine the incidence of visual impairments in middle and old age. They found that 17% of their sample had visual impairments, and that these numbers increase with increasing age. About 95% of adults over the age of 65 reported needing glasses to assist with vision. However, the effectiveness of glasses in correcting vision decreases with age. It is notable that in elders over the age of 85, less than half report that their glasses corrected all of their visual problems (AgeWorks, 2000; Ebersole & Hess, 2001).

According to the Lighthouse survey (1996), people with visual impairments are more likely to be female, unmarried, of low socioeconomic status, and of poor health or with poor access to health care. They are also more likely to be minorities. The oldest-old are at the greatest risk, particularly when they are of low socioeconomic status. They are likely to report the severest vision impairments.

Typical vision problems include the following:

- *Poor **visual acuity** or clarity:* Our ability to identify objects (stationary or moving) at a distance declines with age.
- *Presbyopia:* Latin for "old eyes"—the person cannot focus as clearly when objects are up close. These losses occur gradually from childhood, but do not typically become problematic until middle age, around 40–50, as the lens begins to lose flexibility. Eyes become easily fatigued. Presbyopia is easily correctible with glasses, and by age 55 most people begin to wear glasses on a part-time basis such as when reading.
- *Other problems:* These include increased sensitivity to light and glare. Increased sensitivity to light may lead to excessive watering of the eyes and blurred vision (National Institute on Aging, 1998). Sometimes the eyes produce too few tears, which can lead to itching and burning sensations, and sometimes reduce vision. Under conditions of glare, direct light narrows the visual field and limits peripheral vision. These individuals are typically blinded by direct beams of light, thus impairing their ability to drive at night.

Behavioral Cues to Visual Deficits

When people begin to have vision problems, they start to adjust the distance at which they hold the paper or a book in front of them when they read. This is to compensate for loss of vision for items that are closer in distance. Also common is for people to begin to squint in an attempt to bring far-away items into focus. Squinting helps cut down on some of the visual glare that may be impairing sight. Thus, it may take an aging person several years before his or her vision deteriorates to the point where he or she seeks assessment and/or treatment.

Visual deficits may lead to coordination difficulties in which the person has problems buttoning his or her shirt or finding food on a plate. He or she may have difficultly distinguishing an object from its background, leading to clumsy navigation of daily activities. This difficulty in distinguishing objects may also result in an older adult choosing brightly colored objects over more dull objects because their heightened color contrast helps the older adult distinguish them (Family Development and Resource Management, 2004).

Common Visual Diseases

- *Age-related **macular degeneration** (ARMD):* This disease affects 10% or more of older adults. It usually occurs bilaterally and is a leading cause of blindness in the United States. Neurons in the center of the retina no longer function (due to hardening and blocking of the retinal arteries) resulting in blurred vision and loss of central vision. Two types of ARMD are wet and dry (see Chapter 11).
- ***Diabetic retinopathy:*** As a long-term effect of diabetes, the blood vessels to the eyes grow weak and rupture, causing vision loss that may lead to blindness. New blood vessels form and "scar tissue may form along these new vessels, pulling on the retina causing macular distortion and possible retinal detachment" (Springhouse, 2001, p. 1158).

- ***Glaucoma:*** This disease affects 2% of adults over the age of 40 (Springhouse, 2001). Glaucoma refers to a collection of eye disorders characterized by a buildup of viscous fluid (aqueous humor) in the intraoccular cavity. The most common type of glaucoma (wide-angle glaucoma) occurs when the normal method of fluid drainage (out of the back of the eye through a small channel known as the trabecular meshwork) becomes blocked. This buildup of fluid creates pressure and damages the optic nerve. The cause of this blockage is as yet unknown, but the condition appears to be heritable. Glaucoma results in gradual loss of vision, and if left untreated, can lead to blindness.
- *Senile **cataracts:*** These are most commonly found in adults over the age of 70. It refers to a clouding of the lens, which blocks light reflecting through the lens, and can blur the image that is reflected onto the retina, resulting in hazy vision. Cataracts are most likely caused by changes in the proteins within the lens, which can cause blindness when severe; however, this can be corrected through surgery (surgical removal of the lens), which is effective in 95% of cases (Eliopoulos, 2005; Springhouse, 2001).
- *Retinal detachment:* More common in men than women, this condition occurs when the retina separates from the back of the eye and fills with vitreous fluid. Once separated, it is cut off from its blood supply, impairing its ability to function. This may result in severe visual impairment or blindness; however, this is usually correctable through surgical reattachment. In adults, this is typically caused by degenerative changes in the eye (leading to a torn retina), but may also result from trauma, disease, or intraoccular pressure.

The Impact of Visual Deficits on Communication

Declining visual skills may result in gradual isolation and a decrease in exchange of communication with the environment. As the person becomes less able to navigate outside of his or her home, he or she may become less socially active. Visual impairment may be a source of embarrassment to the older adult and serve to decrease the likelihood that he or she will engage in public activities (e.g., eating out in a restaurant, attending social gatherings, etc.) as well as further his or her isolation.

When interacting with older adults with visual problems, it is important to position objects within their visual field. This includes positioning yourself within their visual field when speaking with the person. This helps the person to locate the object of conversation and to be oriented to the topic of conversation.

When assisting elders with their care needs, it may be useful to give them a verbal indication of the actions you are about to take, to avoid startling or scaring them needlessly (Family Development and Resource Management, 2004). It may be necessary to assist the person in labeling objects or to simplify what is in their visual field (e.g., reduce unnecessary clutter).

A more extreme situation is the case of visual illusions (distorted perceptions of vision). Due to the aging eye's decreased elasticity and accommodation abilities, illusions may occur in

the normal functioning brain when information is misinterpreted, such as seeing a shadow and misinterpreting it as a person. Other visual misperceptions include seeing little flecks or spots in the visual field when in bright light, or seeing shadows as people. Visual hallucination occurs in the damaged brain. The following is an example of visual illusion:

> *It's mid-afternoon in an adult day care program, and the filtered afternoon sunlight is shining through the trees and bay window and onto one of the chairs at the table. Ethel, an 82-year-old female with some ambulation difficulties, is being escorted to the lunchroom when she stops suddenly and refuses to enter the kitchen. After persuasion and coaxing to enter the room were met with denial, Ethel was finally asked why she did not want to enter the room. Ethel proclaimed to the staff, "Look at all that water spilling from that chair onto the floor!"*

Clearly Ethel did not want to enter the room for fear of slipping in the water. If staff were not aware of the possible interaction of her visual deficits and the low lighting in the environment, it is possible that her refusal to enter the room could have been misinterpreted as a behavioral problem, a symptom of dementia or delirium, or the presence of some other medical problem.

Hearing

Typical Age-Related Changes in Hearing

Hearing loss is a commonly observed phenomenon in older adults and is one of the most common disabilities in the United States. Hearing begins to decline on average in our 30s and continues more rapidly with age (Pirkl, 1995). Beginning at or around age 50–55, most adults start to lose sensitivity to pitch; the very high frequency consonants (t, p, k, f, s, and ch) are lost first (Scheuerle, 2000). Background noise such as the hum of traffic or air conditioners may drown out voices, making conversation harder to hear. Higher pitched voices may not be understandable (Springhouse, 2001). Although hearing loss can begin or occur in young people, this is not normal hearing loss (Belsky, 1999). However, the general pattern is for hearing to decline with age, with 20–30% of Americans experiencing a hearing loss over the age of 65 years and 40–50% over the age of 75 (Jerger et al., 1995; NIDCD, 2004).

Types of Hearing Loss

Conductive problems. Sound waves are blocked as they travel from the outer ear canal to the inner ear and, thus, there is a decrease in hearing sensitivity. Conductive loss can be caused by anything that blocks the external ear, but excessive wax (cerumen) buildup is the most common cause of conductive problems (Springhouse, 2001), with nearly one in three older adults having their hearing reduced by up to 35% (AgeWorks, 2000). Other causes of conduction problems include benign tumors, if left untreated, and otosclerosis. Membranes in the middle ear become less flexible with age. The small bones (ossicles) become stiffer. Sometimes malformed or fused bones (otosclerosis) can lead to impaired movement of the stapes, thus preventing the transmission of sound waves. This is twice as likely to occur in women as in men, and usually occurs between adolescence and middle age (Springhouse, 2001).

Sensorineural problems. Sound wave transmission is interrupted from the inner ear to the brain, most likely due to damage to the cochlea and/or auditory nerve. The most common form

of age-related hearing loss is called **presbycusis** (a gradual hearing loss that occurs with advanced age). Presbycusis is typified by problems hearing high-pitched tones and a decrease in speech discrimination. This occurs due to loss of hair and supporting cells and nerve fibers in the cochlea. Loss of neurons in the cochlea can lead to poor word recognition (Springhouse, 2001). Presbycusis is the fourth ranked chronic disability in older adults (aged 65 and older) (Jerger, Chmiel, Wilson, & Luchi, 1995).

Persistent exposure to noise pollution. Not all hearing loss is due to primary aging factors. A weak tympanic membrane (ear drum) may become damaged due to environmental noise or pressure changes. Employment-related damage—in construction workers, racecar drivers or pit crews, people who work in concerts, and combat/hunting–related damage—is a common cause of hearing loss. This type of hearing loss is more likely to affect men because a larger proportion of men tend to work or engage in these fields.

This type of hearing loss can be either temporary or permanent depending on the extent of the exposure. Long-term exposure to environmental noise can also result in **tinnitis**, a condition in which the person experiences a persistent ringing, buzzing, humming, roaring, or other noise in the ears that only the person can hear.

Exposure to Ototoxic Substances

Some medications such as aspirin, antibiotics, diuretics, and antidepressants can cause hearing loss or tinnitis. Although some hearing symptoms will reverse when the offending medication is withdrawn, some losses are typically permanent.

Poisons such as arsenic, lead, or mercury are toxic to the inner ear and typically affect the eighth cranial nerve. Exposure to these substances may lead to either temporary or permanent hearing loss (Springhouse, 2001).

Acute Trauma

Damage at the level of the central nervous system due to head trauma (most likely caused by falls) can cause hearing loss. If the damage is to the eighth cranial nerve, then sensorineural loss will be observed. If the damage is to the temporal lobe (the cortex), a loss of certain frequencies and pitches occurs.

Medical Conditions

The following medical conditions can cause hearing loss:

- Hypertension (treatable cause of tinnitis)
- Type II diabetes
- Effects of cigarette smoking
- Chronic viral or bacterial infections in the middle ear (if untreated)
- Exposure to measles, mumps, or meningitis (can lead to sensorineural deficits)

Difficulties Detecting Hearing Loss

Despite the fact that hearing loss is a common occurrence in older adults, it is not routinely assessed (Tsuruoka et al., 2001). It is estimated that only 20% of primary care physicians routinely assess older adults for hearing loss. Compounding this problem is that the patients themselves may not be aware of their deficit. This may be due to several factors, including compensation, a failure to report due to ignorance of their condition, and/or embarrassment.

People often compensate for mild hearing loss by engaging in such behaviors as turning up the volume of the television, pretending to understand conversation, or attempting to fill in the gaps in conversation by using contextual cues. Missing sounds may not be detected by the person, and he or she may miss entire events and not know it. Thus, it is not surprising that in studies of hearing loss, some researchers have

found that the affected person judges his or her impairment as less severe than the spouse does (Chmiel & Jerger, 1993). Conversely, because of social stigma and embarrassment, individuals may not report their hearing loss to others, and instead may withdraw socially to prevent others from detecting their hearing loss.

Older adults who do seek assistance with hearing problems have typically experienced some hearing loss for years before seeking help. One estimate of the time between the experienced loss and treatment seeking is as high as 10 years (Jerger et al., 1995)!

Indications of Hearing Loss

Hearing impairment may lead to the following behaviors:

- Inattentiveness and/or inappropriate responses or no response to questions
- Asking repetitious questions, or asking for things to be repeated
- An increased reaction to loud sounds
- Increased or unusually loud speech during conversation, especially in areas with some type of background noise
- Tilting/cocking head toward a sound in an attempt to facilitate hearing
- Isolation and/or emotional upset as a result of problems in communicating with others either in group settings or individually

The Impact of Hearing Deficits on Communication

Hearing loss has adverse effects on multiple domains including cognitive, emotional, behavioral, and social functioning. Hearing impairment can lead to negative outcomes such as decreased quality of life, depression, loneliness, impaired communication, and isolation (Jerger et al., 1995). Thus, it is imperative that individuals be assessed and treated.

Individuals with hearing loss may have trouble functioning independently. They may find it difficult to understand (and therefore follow) their primary care health care provider's advice, and they may be prone to more accidents (difficulty responding to warnings or alarms) (National Institute on Aging, 2004). In addition, mild to moderate hearing loss is more likely to lead to social isolation. This may be related to becoming frustrated with having to constantly ask others to repeat themselves. This also may be related to embarrassment over having failed at conversation (Tsuruoka et al., 2001). Conversely, the social isolation may sometimes be due to others who may unconsciously stay away from those people with whom it is difficult to have a conversation.

When communicating with a person who presents with hearing impairment, do not shout. Shouting increases the intensity and pitch of the words, but does not aid in hearing what is being said (Family Development and Resource Management, 2004). Attempt to project your voice from your diaphragm (which deepens the tone). Ensure that you are standing in front of the person in a well-lit room. This will help to assist him or her with lip reading. Alert the person that you are addressing him or her with a light touch or visual cue, and wait for him or her to visually orient to you before speaking. If the person has better hearing in one ear, attempt to speak to that side if possible. If the person wears a hearing aid, ensure that it is turned on. Use gestures or objects to assist with communication (Family Development and Resource Management, 2004).

Limit background noise. If conversing with a hearing-impaired elder, it is helpful to turn off televisions, radios, and air conditioning units

that may make it difficult for the person to distinguish voices from the background noise.

Make sure to allow adequate time for a response. Rewording the question may only serve to further confuse the person. It may be more helpful to use short sentences and speak clearly, taking care to enunciate words (Springhouse, 2001). At times, you may have to resort to writing or using a pictogram grid for communication. The use of other modes of communication, such as gestures or touch, also might be helpful.

Speech and Language

Typical Age-Related Changes in Speech and Language

With age, normal changes in speech and language occur as a result of physiological and cognitive changes. Decreased respiration strength may cause the voice to become deeper and speech may become more shaky and breathy. In addition, pitch may vary and the voice may sound tremulous as a result of changes to the laryngeal structure. Some older adults may experience an overproduction of mucous, which may result in frequent attempts at throat clearing. Reduced saliva, loss of teeth, and decreased elasticity and muscle tone of the face are also common and may cause changes in articulation. Cognitive changes associated with aging also may be responsible for older adults using fewer words and making more semantic errors than younger adults (Beers & Berkow, 2004), but most speech problems in elders are due to some type of brain pathology.

Pathological Changes in Speech and Language

Changes in speech or the ability to use language may result from disease or injury.

- **Dysarthria** is disturbed articulation. It is a result of disturbance in the control of the speech muscles. This disturbance is caused by brain lesions in motor areas in the central nervous system or the brain stem or disruption in the coordination of information from the basal ganglia, cerebellum, and motor neurons. Dysarthria can be caused by stroke, brain tumor, degenerative diseases, metabolic diseases, or toxins. The location of the brain lesion determines the nature of the disturbance, which can manifest in many ways, with the most severe form being anarthria (complete inability to move the articulators for speech). People with dysarthria may present with slurred speech, breathiness, slow or rapid rate of speech, limited mouth or facial movement, monotonous voice, or weak articulation. A person who has dysarthria may be able to read, write, and gesture normally and comprehension may remain intact (Duffy, 1995; Finlayson & Heffer, 2000).
- **Verbal apraxia** is a disorder caused by damage primarily to the parietal lobe, which is involved with somatosensory processing. This is a neurological disorder characterized by impairment in initiation, coordination, and sequencing of muscle movement, which results in difficulties executing mouth and speech movements. People with verbal apraxia have the intention and the physical capacity to move the muscles that are involved in speech, but have difficulties speaking because of loss of volitional control over the muscles. This condition often accompanies aphasia (*Merck Manual of Geriatrics*, 2004).

- **Aphasia** is the most common language disorder in the elderly and occurs in up to one third of the patients in an acute phase following stroke (Wade, Hewer, David, & Menderby, 1986). Aphasia is an inability to express or understand the meaning of words due to damage in the language areas of the brain. Damage is most frequently due to stroke in the left hemisphere, but can be due to brain tumor, trauma, infection, dementia, or surgery. In addition to spoken language, writing, reading, and the ability to gesture also may be impaired. Receptive (fluent) aphasia is characterized by the inability to comprehend spoken or written language, but intact expressive ability. However, although the production of speech is intact, the meaning of spoken language is severely distorted and words do not hang together. This is a result of damage to Wernicke's area in the brain, which is responsible for the meaning of language. Expressive (nonfluent) aphasia is characterized by the inability to produce language in either an oral or a written form, but relatively intact language comprehension. The person produces very few effortful words, short sentences, and many pauses. This aphasia is due to damage to Broca's area, which is in charge of speech production. In most cases, however, a combination of deficits exists and aphasia is never purely expressive or receptive. Global aphasia is the most severe form of aphasia and is characterized by severe impairment in the production of recognizable words as well as in the understanding of spoken language (Duffy, 1995; Finlayson & Heffer, 2000).

Other medical conditions may also result in impairment in speech. For example:

- Chronic obstructive pulmonary disorder (COPD) is a common condition in older adults that is characterized by blockage of airflow in the lungs. Speech is likely to be low and pitch-restricted in range. Because of frequent coughing and dyspnea, people may also present with chronic hoarseness (Duffy, 1995).
- Some older adults may require support by mechanical ventilation because of respiratory failure. Those who require mechanical ventilation often need to communicate by an alternative means such as a communication board.
- Using an electrolarynx, which is a voice box that produces sounds based on air vibrations, may be used by laryngectomy patients or others wo have had throat surgery affecting the voice.
- Another medical procedure that affects communication is laryngectomy. This is an operation where a portion or all of the larynx is removed, as is used in treating patients with laryngeal or hypopharyngeal cancers. After total laryngectomy, patients can no longer use their own voice. Instead, writing, mouthing words, gesturing, or an electrolarynx may be used. A surgical procedure to restore speech can also be performed, but this requires some additional practice and adaptation (Duffy, 1995).

Case Study 4-1

Mrs. Schmidt is a 64-year-old woman who has been staying at an acute care facility for over 3 months. She has been suffering for several years from chronic obstructive pulmonary disease and was placed on mechanical ventilation last fall. She was initially admitted to your facility for a weaning trial from the mechanical ventilator. For the past 3 months, she had failed several trials of weaning. Last night, the physician informed her that she was to leave the acute facility, connected to the mechanical ventilation, and that no further trials would be initiated. This morning, you ask Mrs. Schmidt about her preparations for leaving the facility. In response, Mrs. Schmidt starts crying dramatically and asks to see the attending physician. She is extremely upset, stating that "no one had told her anything about this." She is adamantly asking for an extension of her stay and for another weaning trial. Two weeks later, Mrs. Schmidt is completely weaned from the mechanical ventilation. She still has a Foley catheter, which she refuses to let go, saying that she "cannot be without it."

Questions:

1. What are some of the potential challenges for communicating with Mrs. Schmidt?
2. How would you assess for these challenges?
3. What are some of the potential explanations for the communication difficulties described in this vignette?
4. Is there anything that should have been done differently?
5. How would you explain Mrs. Schmidt's miraculous ability to wean?
6. How would you explain Mrs. Schmidt's refusal to "let go" of the Foley catheter?

The Impact of Speech and Language Deficits on Communication

It is important to keep in mind that deficits in speech and/or language are not necessarily global and are likely to vary from person to person. For example, one person may not be able to produce spoken language, but will have no difficulties in comprehending language, whereas another person may have deficits in both comprehension and production of language. Our interactions should, of course, be adapted according to the specific needs and deficits of the elderly.

People with speech or language difficulties might be more anxious or self-aware when communicating and, thus, an environment that is low in distractions and that allows the elderly to feel relaxed might be helpful. Position yourself in close proximity to the elderly person, and face him or her so that eye contact is maintained and facial expressions and body language are easily conveyed. In addition, be open and prepared to using multiple forms of communication, such as body language, writing, or pictorial information. Using short uncomplicated sentences that offer simple choices may also be helpful. Rephrasing and using physical demonstrations can be helpful for those who have comprehension difficulties.

In cases when speech production is impaired, summarizing the message in order to check for accuracy may be helpful. It also is important not to correct every error and to respect the elder's limitations. Be patient and accepting even when communication takes time and effort.

Touch

Touch, pressure, vibration, pain, and temperature are sensations that we receive through our skin and are part of the **somatosensory system**. The skin responds to external stimuli, which are then interpreted by the brain as softness, pain, or heat. Research has demonstrated that despite wide variability across individuals, there is a reduction in tactile and vibration sensations as well as decreased sensitivity to warm or cold stimuli as we age (Kenshalo, 1986; Stevens & Patterson, 1995; Thomson, Masson, & Boulton, 1993; Thornbury & Mistretta, 1981). Reduced touch sensitivity is more prevalent in the fingertips than in other locations, such as the forearm and lip (Stevens & Patterson, 1995).

Reduction in somatosensory sensitivity has been attributed to reduction in the number of receptors and to a reduction in the blood flow to the receptors that occur as we age (Gescheider, Beiles, Checkosky, Bolanowski, & Verrillo, 1994; Verrillo, Bolanowski, & Gescheider, 2002). However, not all older adults present with somatosensory deficits, and certain medical conditions associated with aging, such as dementia, diabetes, arthritis, and Parkinson's disease, may exacerbate changes in the somatosensory system (McBride & Mistretta, 1982; Mold, Vesely, Keyl, Schenk, & Roberts, 2004; Muller, Richter, Weisbrod, & Klingberg, 1992).

Somatosensory information plays an important role in assuring our safety. For example, the experiences of pain or heat alert us to change our position in the environment, to avoid certain situations, or to change the environment altogether. Reduced somatosensory sensitivity in the elderly has been associated with an increase in injuries, such as hypothermia (a dangerously low body temperature), burns, or pressure ulcers (reddened skin that breaks down and is caused by lack of blood flow and mechanical stress to the skin). Reduced tactile perception also has been associated with postural instability and with the difficulties of older adults to position and orient their bodies in space (Corriveau, Hebert, Raiche, Dubois, & Prince, 2004; Toshiaki et al., 1995).

The Impact of Somatosensory Deficits on Communication

When older adults present with injuries, it is important not to interpret the injuries as intentional or abuse in nature, but instead to try to identify alternative means to communicate the very essential somatosensory information. For example, teaching older adults to read the thermostat in order to detect the water temperature might help those with somatosensory deficits

to notice excessive hot or cold temperature. Encouraging older adults to move out of their chair frequently can prevent pressure ulcers.

Some older adults might grasp objects tightly or use their mouth to explore the quality of objects. It is important to recognize that these behaviors might be a result of sensory deficits, where the mouth becomes a tool for making sense of the world. It might be useful to describe the objects verbally or pictorially and to allow the person to explore them using all means (as long as this does not pose a danger to the individual).

When engaging in physical activity with older adults, it is important to use verbal explanations to describe the physical activities as they take place. It also is important to assure grip before releasing the older adult.

Some older adults may completely avoid tactile sensations because of their deficits. When older adults avoid activities that require touch, such as sewing or painting, you might want to encourage them to revert to activities that capitalize on strengths and abilities they have maintained; for example, encouraging older adults to sing or read.

Movement

Movement is an important ability that fosters independence and promotes interaction and understanding of the environment (Wang, Badley, & Gignac, 2004). Movement is a function of many variables, such as posture, balance, flexibility, tone, strength, sensory integration, reflexes, and motor planning. Movement produced by the large muscle groups is called **gross motor movement**, and movement produced by the small muscle groups is called **fine motor movement**. Research has shown that both gross and fine motor movements are affected by the aging process, aging-related diseases, and a sedentary lifestyle associated with aging. In general, as we age, movement is characterized by reduced velocity (speed) and accuracy and greater variability across individuals (Fozard, Vercruyssen, Reynolds, Hancock, & Quilter, 1994; Mattay et al., 2002; Smith et al., 1999; Welford, 1982).

Movement Disorders in Older Adults

Parkinson's disease (PD) is a chronic neurodegenerative condition that is characterized by impairment in the nerves that control movement. This is a progressive disease that affects the basal ganglia in the brain. People with PD have a shortage of dopamine. It is not clear, however, what causes Parkinson's disease. The major symptoms of PD include tremor, rigidity and stiffness, slowness of movement, postural instability, and/or impaired balance and coordination. Other symptoms may include memory problems, depression, hallucination, and mild vision loss. The course and rate of progression vary. Currently, there is no cure for PD. However, medications that increase the presence of dopamine in the brain improve some of the symptoms of PD (Ebersole & Hess, 1998).

The Impact of Parkinson's Disease on Communication. Although the course of PD varies and deficits are not uniformly present, this condition is likely to impair communication in a variety of ways:

- Speech may become more slurred, soft, hoarse, or have an inappropriate rhythm.
- Writing may become smaller, shaky, and difficult to read.
- Facial expressions may be lost.

Thus, the presence of PD may impact the ability to communicate verbally as well as nonverbally.

Disability

Activities of Daily Living/ Instrumental Activities of Daily Living

Activities of daily living (ADLs) are basic tasks that one needs to perform in order to survive. These include, eating, bathing, toileting, transferring, and grooming. **Instrumental activities of daily living (IADLs)** are more complex tasks that include handling finances, preparing meals, or managing one's medications. Because of their basic nature, impairments in ADL are considered more severe than IADL impairments. ADLs and IADLs are often used to assess functioning. Impairment (deviation from the norm) in ADLs/IADLs is most prevalent among the elderly. It is estimated that about 26% of people between the ages of 65 and 74 report functional limitations, whereas almost 50% of people over the age of 75 report such limitations. Research has shown that 14% of older adults have ADL limitations and as many as 21% of older adults have impairment in IADLs (Administration on Aging, 2002). The rates of unmet needs associated with ADL impairments are very high. Unfortunately, research has shown that as many as 20% of those who had at least one ADL impairment did not receive adequate assistance to meet their needs (Allen & Mor, 1997; Desai, Lentzner, & Weeks, 2001).

Risk Factors for Impairment in ADL/IADL. In addition to age, other risk factors for ADL/IADL impairment include being female (Collison, Cicuttini, Mead, & Savio, 1999; Oman, Reed, & Ferrara, 1999), cognitive impairment (Hebert, Brayne, & Spiegelhalter, 1993), the presence of a chronic disease (Collison et al., 1999), lack of exercise (Stessman, Hammerman-Rozenberg, Maaravi, & Cohen, 2002), depression (Han, 2002), subjective health problems (Collison et al., 1999), and low socioeconomic status (Kaplan et al., 1993). Research has shown that the trajectory of ADL changes across time is highly individualized. A steep decline in ADL functioning can be a predictor of serious medical or cognitive problems. The majority of elders remain relatively unchanged in their ADL functioning (Li, 2005).

Measuring ADL/IADL. Measures of ADL/IADL have become increasingly popular because these are very sensitive indicators of hospital stay, nursing home placement, and mortality (Reuben, Rubenstein, Hirsch, & Hays, 1992). Most of the time, the presence or absence of a medical diagnosis would be less indicative than ADL/IADL functioning. Thus, information about ADL/IADL functioning can be used not only as a prognostic tool, but also to determine the person's level of need for care. Additionally, information about ADL/IADL can assist in setting realistic goals for treatment, developing an appropriate treatment plan, and monitoring change over time.

Both ADLs and IADLs have their limitations as indicators of functional impairment. ADLs are very basic and, thus, may not be sensitive enough to capture less severe disability. Some IADLs tend to be gender specific (e.g., cooking a meal) and, thus, not applicable to the entire population, especially in the older cohort that obeys more traditional gender role standards.

Self-report measures of ADL/IADL are easy to use and require no prior training. However, research has shown that older adults often overestimate their abilities, whereas family members underestimate their loved one's abilities (Rubenstein et al., 1988). Furthermore, physicians were found to be poor judges of ADL/IADL (Elam et al., 1989). To complicate things,

simple changes in the wording of questionnaire items resulted in major differences in prevalence estimates of functional disability (Picavet & van de Bos, 1996).

Direct observation of one's performance is considered to be more objective and replicable. However, it is important to consider the level of motivation when judging someone's functioning level. Additionally, performance-based measures may assess tasks that are irrelevant to the everyday life of the elderly. Thus, a combination of self-report and direct observation is warranted.

Compensating for ADL/IADL Impairments. Depending on the impairment in ADL/IADL, one might use assistive devices such as a calendar or a pill organizer to overcome difficulties in managing one's medications. Others might use clothes with large buttons or hook-and-loop fasteners when faced with dressing difficulties. Changes in the environment such as the addition of handrails, raised toilet seats, and shower stools also can be implemented.

Cognitive Changes

There is a high variability in cognitive functioning both within individuals and across individuals. Some cognitive functions decline with age, some remain stable, and others improve. Most studies suggest that people in their 30s and 40s show their best cognitive abilities, which decline thereafter. However, it is estimated that cognitive changes become noticeable only when people are in their 70s.

A distinction is often made between **fluid intelligence** versus **crystallized intelligence**. Fluid intelligence is believed to decline over time, whereas crystallized intelligence is believed to remain stable (Abeles et al., 1998). Some of the skills that decline with age include information processing speed, divided attention, sustained attention (the ability to focus cognitive activity on a stimulus), performance on visual-spatial tasks (e.g., drawing and block construction), word finding, rapid naming ability, abstraction, and mental flexibility. Short-term memory may show slight decline with age (such as forgetfulness), while long-term memory (related to retrieval) is mildly affected by normal aging. Verbal comprehension and expression remain stable. Vocabulary may improve with age. It also is believed that wisdom and the accumulation of practical expertise continue to improve throughout the lifespan (Abeles et al., 1998).

Common Pathological Cognitive Changes

Delirium. Delirium, an acute and usually reversible condition, is quite common in hospital settings, accounting for 10%–15% of admissions in elders; another 10%–40% may be diagnosed during their hospital stay (American Psychiatric Association, 1994). Delirium is very commonly seen in the terminally ill, with up to 80% developing it as they near death. The *Diagnostic and Statistical Manual of Mental Health Disorders,* 4th edition (DSM-IV, American Psychiatric Association, 1994) defines delirium as:

1. Disturbance of consciousness with reduced ability to focus, sustain, or shift attention.
2. A change in cognition (such as memory deficit, disorientation, or language disturbance) or the development of a perceptual disturbance that is not better accounted for by a preexisting, established, or evolving dementia.
3. The disturbance develops over a short period of time (usually hours to days) and tends to fluctuate over the course of the day.

4. There is evidence from the history, physical examination, or laboratory findings that the disturbance is caused by several different possible events including general medical conditions (cancer, AIDS), metabolic disturbances (including electrolyte disturbances as occurs with dehydration), drug intoxication, drug withdrawal, drug side effects, and multiple etiologies.

A good history and intake is important because delirium could easily be misinterpreted as many other disorders including psychotic disorders, dementia, and mood disorders with psychotic features.

The prognosis for an individual with delirium is good to excellent if correctly identified and treated. Particularly in the medically ill, delirium is associated with increased risk of developing medical complications and functional decline. If misdiagnosed, delirium can be life threatening, leading to coma, seizures, and eventual death.

The impact of delirium on communication. Given that a person with delirium commonly experiences hallucinations and tends to be disoriented and confused, communication is often fraught with misinterpretation and the person is likely to respond inappropriately (Springhouse, 2001). The following are guidelines for communication with delirious elderly:

- Keep the discussion simple and questions concise.
- Use large print calendars and clocks to assist with orientation to time.
- Pictures of family members and loved ones might assist in reorienting the elder.
- Some older adults may experience an increased state of delirium in the darkness, so a well-lit room might be helpful.
- Offer frequent reassurance, because the person is likely to be anxious and fearful. Physical restraints are *not* recommended, because they may increase fear and agitation. Distraction and soothing conversation should be tried instead.

Dementia. There are over 35 million elderly over the age of 65 in the United States (U.S. Bureau of the Census, 2000). This number is projected to increase to 70 million in the year 2030. This poses the potential for a dramatic increase in those with the highest vulnerability for dementia. Dementia is not a disease, but rather a grouping of symptoms known as a syndrome, which may be caused by a number of different sources (Anthony & Aboraya, 1992). This is a progressive illness that impairs social and occupational functioning (American Psychiatric Association, 1994). The DSM-IV (1994) defines the criteria for dementia as:

1. Development of cognitive deficits:
   - The person cannot recall new or previously learned information.
   - Memory problems must be present.
2. One or more of the following:
   a. *Apraxia:* Impaired motor activities due to damage to motor cortex (e.g., the person cannot use a key)
   b. *Aphasia:* Language disturbance (e.g., cannot find words or put sentences together)
   c. *Agnosia:* Failure to recognize or identify objects (e.g., the person may see something but cannot label it or tell what it is used for)
   d. *Disturbed executive functioning:* Planning, organizing, sequencing, and abstracting problems due to frontal lobe damage

In addition to general loss of cognitive functioning, it is typical to see changes in personality, affect, and behavior over the course of the disease as a result of pathophysiological changes in the brain (Kasl-Godley & Gatz, 2000).

Dementia can have irreversible or reversible causes. The term *irreversible* refers to the inability to cure or reverse the symptoms with medical or psychological treatment. Examples of irreversible causes include head trauma (repeated blows to the head, as happens in professional boxing), infections such as those related to HIV and AIDS, brain tumors, and genetic diseases (Holland, 1999). Other irreversible causes include progressive diseases such as **Alzheimer's disease,** Huntington's disease, Pick's disease, Lewy body dementia, and Parkinson's disease (APA, 1998). Dementia can also be caused by vascular disease including multi-infarct dementia, which is caused by a series of small strokes (Kasl-Godley & Gatz, 2000).

Approximately 10%–20% of dementias are reversible (Cooper, 1999). These are sometimes referred to as pseudodementias. The potential for reversibility depends on the etiology and treatment availability (Kaplan & Sadock, 1998). Typical causes include depression, hypothyroidism, drug toxicity, and hydrocephalus. Dementia secondary to depression is reversible, although recent research has indicated that a large number of these individuals go on to develop irreversible dementia later (Raskind & Peskind, 1992).

Alzheimer's disease. As previously mentioned, dementia can be caused by a number of different sources. Alzheimer's disease is responsible for 50%–60% of all dementias in adults after the age of 60. The progression of dementia of the Alzheimer's type is commonly detailed into three stages:

1. *First Stage* (duration 2–4 years, leading up to and including diagnosis)
   - Progressive memory loss (e.g., forgetfulness, misplaced objects) and confusion (e.g., easily overwhelmed by tasks, disorientation)
   - Mood and personality changes—may become more labile or depressed
   - Loss of spontaneity and initiative in verbal and nonverbal communication and activity engagement
   - Decreased concentration abilities
   - Impaired judgment and thinking
2. *Second stage* (duration 2–8 years)
   - Increasing memory loss and confusion
   - Difficulty recognizing loved ones
   - Poor impulse control with frequent outbursts, mood lability
   - May show aggressive behavior
   - Hallucinations or delusions
   - Aphasia and **confabulation** (filling in words or memory gaps with information that is made up in order to compensate for memory loss)
   - Agraphia (inability to write)
   - Sleep disorders
   - Agnosia
   - Repetitive behaviors common, wandering and restlessness
   - Hyperorality (the need to taste and orally examine objects small enough to be placed in the mouth)
3. *Third stage* (duration 1–3 years)
   - Loss of weight or conversely binge eating and weight gain
   - Loss of most self-care skills
   - Incontinence of urine and bowels
   - Minimal to no communication, may scream

- Multiple physical health problems and eventual death
- Progressive decrease in ability to respond to environmental stimuli

Alzheimer's disease has often been deemed a disease of "ruling out." Although neuropsychological testing can be very useful in clinical diagnosis, a definitive diagnosis may be made after death when an autopsy is performed and the hallmark pathophysiological features are identified.

Delirium and dementia are not necessarily mutually exclusive. Delirium can occur in a person with dementia, making accurate diagnosis and treatment difficult. It is important, therefore, to develop an understanding of the similarities and differences between the two. A good history is important in helping with differentiation. However, given the person's symptom presentation (e.g., confusion and disorientation), the person is unlikely to be a good historian. Collateral information is important to gather, if possible. Refer to **Table 4-2** for a comparison of the two conditions.

The impact of dementia on communication. Communication with an individual with dementia is extremely important to successful interaction and completion of caregiving duties. *In the early stages of dementia,* individuals may have difficulty finding the words to express what they are trying to say (aphasia) and they may substitute one word for another. They may not be able to understand abstract concepts or more complicated language phrases. In either of these cases, elders and caregivers can become frustrated, embarrassed, and upset about their inability to communicate with each other effectively. This can lead to a reduction in social contact and reduced feelings of self-worth for the patient.

In individuals with more moderate to severe dementia, verbal abilities are likely to be severely limited. Many times individuals with cognitive impairment can become agitated because they do not understand what is expected of them. In addition, they can become easily frustrated if their attempts at communication are misunderstood. It may be important to use other means of communication to facilitate understanding.

Box 4-1 Research Highlight

Aim: The study evaluated the relationship between communication problems and caregivers' burden.

Methods: Eighty-nine dementia caregivers completed a measure on communication problems, care-recipient cognitive and functional status, care-recipient problem behaviors, and caregiver burden.

Findings: Communication problems mediated the relationship between care-recipient cognitive and functional status and problem behaviors. Impaired cognitive and functional status also accounted for greater levels of burden.

Conclusion: The study emphasizes the important role that communication plays in determining the quality of the interaction between caregivers and care recipients.

Source: Savundranayagam, M. Y., Hummert, M. L., & Montgomery, R. J. (2005). Investigating the effects of communication problems on caregiver burden. *Journal of Gerontology Series B: Psychological Sciences and Social Sciences, 60*(1), S48–S55.

Table 4-2 Diagnostic Comparison between Delirium and Dementia

	Delirium	Dementia
Onset	Sudden	Depending on the type of dementia • Alzheimer's disease—onset is gradual and progressive • Vascular dementia—onset can be sudden but progression is in a step-wise decline • Pick's—onset is sudden and decline is progressive and rapid
Prognosis and Duration	If identified properly, the condition is temporary and reversible Lasts from days to months	Depending on the type of dementia • If irreversible, process can be slowed by use of medications but decline is inevitable • If reversible (psuedo-dementia), the process is reversible with treatment of underlying cause; however, some researchers suggest that dementia secondary to depression is a prelude to later irreversible dementia Lasting from months to years
Symptoms		
Orientation	Waxing and waning throughout the day with periods of lucidity	Progressive loss of orientation to time, place, and (lastly) person
Attention	Impairments in ability to attend	Relatively intact immediate attention skills
Memory	Impaired recent and remote memory	Progressive loss of memory with recent affected prior to remote
Learning and abstract thinking	Impaired	Impaired
Psychological	Hallucinations, delusion, and visual illusions common	Personality change, suspicion, paranoia, compulsive behavior, hallucinations/delusions possible
Affect	Labile	Labile, prone to apathy and depression in early stages
Behavior	Impulsive, loss of typical social behaviors	Decreased inhibition, increased agitation, routine important, withdrawal, loss of spontaneous

Table 4-2 Diagnostic Comparison between Delirium and Dementia (continued)

	Delirium	Dementia
	Loss of self-care skills due to inability to sequence steps for correct performance	engagement, wandering and hoarding common Loss of self-care abilities in later stages
Object Naming	Intact to mild	Aphasia, agnosia
Treatment	Maintain proper nutritional intake Maintain fluid intake and balance Address underlying cause One-on-one observation Life-threatening Repetitive orientation, do not reinforce hallucinations	Behavior plans Ensure medication compliance Encourage group and social interaction as well as activity engagement Not usually life-threatening until later stage Clear simple instructions, memory prompts, reminiscence therapy

Sometimes touch can assist in conveying a message and comfort. The caregiver should be attentive to the person's responses, as some people may recoil from touch. In such cases, simple gestures or visual aids may be more effective. Other methods of communication can involve use of familiar songs/music or doing activities together (e.g., going for a walk) to convey care and concern.

Robinson, Spenser, and White (1999) recommend a nondemanding approach for communication. The caregiver's attitude or approach can often set the tone for the interaction. If you are calm, reassuring, and confident, the person is likely to respond in a relaxed and trusting manner. Elders with dementia generally are still attuned to nonverbal cues. If you are angry and tense, you are likely to find the person responding to you in a like fashion. Keep the pitch of your voice low, especially when interacting with a person with hearing impairments. Remember that shouting does not help with understanding and is likely to startle/upset the person with dementia.

When interacting with someone who has dementia, make sure that the person is attending to you prior to beginning a conversation. Face the person and speak slowly and clearly. If you do not have the person's attention, wait a moment and try again. A gentle touch can be helpful, but be careful not to startle the person. Try to be eye level with the person so as to not create feelings of defensiveness or vulnerability. Begin by orienting the person to yourself (i.e., introduce yourself) and refer to the person by name (assists in preserving self-identity and relaxing the person). It is often helpful to reduce or eliminate background noise to improve the chances of maintaining the person's attention and enable him or her to hear you more clearly.

It might be helpful to break tasks into small manageable steps and provide very simple, clear directions. Taking a bath can be overwhelming or confusing to the individual when taken as a whole event and will need to be simplified. When helping someone to undress for bathing, the first step might be to begin with unbuttoning his or her shirt. The next step might be taking one arm out of the sleeve. Sometimes contextual cues may be helpful. Others may only require verbal cues. Throughout the process, remember to keep telling the person what it is you are planning to do next and what it is you are currently doing. Leading a person slowly to the bathroom may assist in understanding what task is about to occur. Likewise, utilizing props may also assist with task recognition (e.g., handing the person a washcloth). Encourage the person to do as much as they can and praise efforts. If an instruction needs to be repeated, repeat it in the same way. This will facilitate comprehension. Assist with steps that may be more difficult for the person to accomplish on their own. This may be a little more time consuming than other approaches, but it is likely to be met with much less confusion and more pleasant interaction.

Use concrete terms and familiar words. Saying phrases such as "Here is your toast" may be more readily understood than "It's breakfast time" (Robinson et al., 1999). Try to offer choices whenever possible. When offering choices, simplicity is better. Use a paired choice procedure ("Would you like orange juice or water?") rather than using open-ended questions, which could generate confusion ("What would you like to drink this morning?"). Use of concrete terms is helpful here, as well. Allow the person adequate time to respond, as the processing of verbal material is slower in individuals with cognitive impairment. Refrain from arguing or attempting to reason with the person regarding delusions or hallucinations, because this can further agitate the patient (Robinson et al., 1999). Instead, speak in soothing tones and attempt to distract the person, if possible.

Encourage discussion of significant life events, family traditions, remote memories, and other past events to encourage social contact and a sense of comfort and security. Utilize memory aids such as large print calendars or organizers to enhance memory. In early dementia, labeling items with large print helps in identification and recognition of objects. Encouraging individuals to refer to these aids can reduce anxiety and paranoia associated with being in unfamiliar surroundings (e.g., hospital room) and enhance self-dignity.

The physical environment can be important for stimulating cognitive functioning, managing behaviors, reducing depression and anxiety, and promoting and maintaining as much independence as possible (National Institute on Aging, 2004). It may be helpful to establish a familiar environment, changing it as little as possible. When the person's environment must change (e.g., moving from home to an assisted living facility) incorporate familiar items from the old environment. Include items that are personally familiar. Contact family members to have them bring cherished and familiar items from home to facilitate this (Robinson et al., 1999).

Psychological Changes

The prevalence of mental illness (with the exception of cognitive impairment) in older adults is lower than in the general population. However, some older adults may suffer from mental illness in late life. The reasons for developing mental illness in late life vary widely. Some older adults may have suffered from mental illness throughout their lives, whereas oth-

ers may experience mental illness for the first time during old age due to changes in their social, medical, or physical circumstances. However, in general, older adults tend to report satisfaction with life at similar rates as the general population (Abeles et al., 1998).

Pathological Psychological Changes

Depression. Depression is a very serious condition that is characterized by at least five of the following symptoms: sadness, anhedonia (lack of interest or pleasure in activities that one once used to enjoy), significant weight loss or gain, a marked decrease or increase in sleep, psychomotor agitation or retardation, fatigue or loss of interest, feelings of worthless or inappropriate guilt, impaired ability to concentrate or think, and recurrent thoughts of death including suicide ideation or attempts (American Psychiatric Association, 1994). Although we all feel "depressed" or "blue" sometimes, clinical depression is more intense, broader, and lasts for at least 2 weeks.

Depression is associated with increased risk of death (either from medical conditions or from suicide), a greater number of medical conditions, higher health care costs, and longer hospital stays (Callahan, Hui, Nienaber, Musick, & Tierney, 1994; Frasure-Smith, Lesperance, & Talajic, 1993; Jiang et al., 2001). Furthermore, the suicide rate in older white men is higher than in any other category (National Center for Injury Prevention and Control). In addition to the negative consequences associated with depression for the elderly sufferer, depression affects the entire family. Research has shown that caregivers of depressed elderly have poorer mental health and perceived quality of life (Sewitch, McCusker, Dendukuri, & Yaffe, 2004). Caregiving for depressed elderly is associated with many hours of informal care and, as a result, is very costly to society as well as to the caregivers themselves (Langa, Valenstein, Fendrick, Kabeto, & Vijan, 2004).

Unique characteristics of depression in the elderly. Depression in the elderly often is associated with multiple medical conditions that limit functioning and mobility. It also is associated with life transitions and with a change in one's status and role as many older adults transition out of the workforce and have to find a new sense of purpose and meaning in their life. Loss of family members and friends also is common in older adults who may experience a reduced support system. Many times, depressed older adults do not report depressed mood, but instead present with lack of interest and enjoyment as well as sleep and appetite problems that are mistaken for other medical conditions (Abeles et al., 1998).

What causes depression? Depression is a common condition, with about 5% to 10% of community-dwelling elderly being diagnosed with clinical depression (Lebowitz et al., 1997). However, in long-term care, these rates are several times higher. Although depression is common in the elderly, it is not a normal part of aging. It is not normal to be depressed, even when you are old or disabled. Depression also is not a sign of weakness or a punishment from God. There are many possible reasons for why one becomes depressed. Depression has been associated with chemical changes in the brain or with chemical imbalance (Leonard, 2000). Depression also has been associated with experiencing helplessness and with the sense of having no control over one's life (Seligman, Maier, & Geer, 1968). Others suggest that depression is associated with negative views of one's self, the world, and others and that these views color one's experiences in the world (Beck, 1964).

Research also has shown that exposure to severe and prolonged stress results in depression (Frank, Anderson, Reynolds, Ritenour, & Kupfer, 1994). Most likely, depression is some combination of all of these explanations.

Treatment for depression. Research has shown that both medications and talk therapy are effective in treating depression in older adults (Lebowitz et al., 1997). Electroconvulsive therapy (ECT; the delivery of an electrical shock that causes electrical activity in the brain) also is an effective alternative, especially when antidepressant medications cannot be taken due to their side effects or due to interaction with other medications. Unfortunately, however, only a small fraction of depressed older adults receive treatment. This can be due to several reasons, including the stigma attached to mental illness, difficulties accessing care, or lack of awareness of available services. Difficulties recognizing and distinguishing depression from other medical conditions that present with similar symptoms are particularly common in the elderly (Charney et al., 2003).

The impact of depression on communication. Often, depressed older adults lose the inclination to interact with others and become increasingly withdrawn. Furthermore, because of their depressed mood, multiple physical complaints, and lack of interest in pleasurable activities, others may prefer not to interact with depressed elderly. This results in depressed elderly being prone to isolation when they are in greatest need for support. As a health professional, you should become aware of your own feelings about working with depressed elderly. Realizing one's own biases is the first step towards providing better care for the elderly.

It also is important to remember that depression is not a willful condition and, therefore, encouraging the elderly to "just snap out of it" is not likely to help. Instead, gently and persistently encouraging older adults to engage in even minor activities is likely to eventually result in an improvement in their mood. It also is important to be aware of the potential stigma associated with mental illness. Many older adults may not express their depressed feelings openly and may not wish to share their depression with others. Being respectful and understanding of their concerns is essential. However, at the same time, you should try to engage and to communicate your availability to the elderly.

Lack of concentration and indecisiveness are potential symptoms of depression. This is likely to make communication with the elderly slightly more challenging and may require repetition of information or the use of memory aides (e.g., sticky notes or a notebook) to improve the ability of the elderly to retain information.

Concluding Comments

In this chapter, we have discussed a variety of changes that can take place in older adults. These changes vary dramatically within and across individuals and may or may not have an impact on communication. Many times, however, these changes require patience, adaptation, and creativity on the part of the people who interact with the elderly. The next chapter will discuss some of the psychosocial interventions that improve communication with older adults who present with sensorimotor or cognitive deficits.

Critical Thinking Exercises

1. Mr. Robert Smith is a 79-year-old male who was recently diagnosed with severe hearing problems. Mr. Smith is very upset about his diagnosis and refuses to wear his hearing aids. What are some of the potential reasons for this emotional reaction? What are some potential alternatives for hearing aids? What would be your recommendations for Mr. Smith?
2. Mrs. Williams is an 81-year-old female. She has been increasingly withdrawn and disengaged. Her appetite had declined and she had lost 15 pounds. Her primary care provider recommended a course of antidepressant treatment in order to boost her energy and mood. Mrs. Williams took the medication for 2 weeks and stopped. What are some of the reasons for lack of adherence to depression treatment in older adults? What can be done to increase the use of antidepressants in older adults? What information could be most useful for Mrs. Williams?
3. Mr. Roberts was recently diagnosed with Alzheimer's disease. His wife and two daughters are extremely upset, calling you in order to learn more about Mr. Roberts's condition. How would you communicate about Alzheimer's disease with Mr. Roberts's family? What information would be most useful for family members of patients with Alzheimer's disease? What should they expect? Is there anything the family can do to help?
4. What information would be most useful for Mr. Roberts? Should he be present when you discuss his diagnosis with his family members? What are some of the pros and cons for doing so? How would you decide?
5. Mr. Brown is a 71-year-old man with a history of arthritis. During a recent fall at home, he fractured his hip. Mr. Brown has been admitted to the nursing home where you work. What information would you seek out in order to assess Mr. Brown's risk for future falls? What would you be most concerned about?

Personal Reflections

1. The best way to understand physiological changes associated with aging and their impact on communication is to have firsthand experience with some of these changes. The Texas Cooperative Extension offers a wonderful Web site with multiple exercises that stimulate some of the aging-related processes. Go to its Web site at http://fcs.tamu.edu/families/aging/aging_simulation/index.php and try to gain hands-on experiences by simulating at least two sensorimotor deficits. Write a short paragraph about your experiences and how these experiences affected your ability to communicate with others in your surroundings.
2. What are some of the difficulties you might experience as a nurse who has to take care of older adults with sensory deficits? What skills would be most important for you to gain in order to overcome these difficulties?
3. What are your thoughts and feelings about treating older adults with depression? What are some of the advantages and disadvantages of treating depression?
4. What alternative modes of communication have you used in the past? Which ones were most effective and why? Which ones were most challenging and why?

Additional Discussion Questions

1. List the common problems with *each* of the sensory systems.
2. Discuss how visual changes may impact an older adult's communication.
3. What types of hearing loss are most common in older adults?
4. Discuss how auditory changes may impact an elder's social functioning.
5. Inner ear problems involving hair, cells, basilar membrane damage, and cochlear damage are common with what type of hearing loss?
6. What are the main concerns with loss of taste and smell?
7. In an older adult with impaired language ability (e.g., from stroke or dementia), how would you know if his or her olfactory or gustatory senses were affected? What could you do to assist him or her?
8. An older adult with dementia is experiencing hallucinations. Explain how you would attempt to communicate and comfort this person. Explain why arguing with a person in this condition is not usually helpful in orienting him or her.
9. An older adult presents to the emergency room with confusion and combativeness. What other information would you need to know before providing a diagnosis and/or treatment?

Glossary

ADLs: Basic tasks that one needs to perform in order to survive.

Alzheimer's disease: A progressive, neurodegenerative disease of the brain.

Aphasia: An inability to express or understand the meaning of words due to damage in the language areas of the brain.

Cataracts: Clouding of the lens, which blocks light reflecting through the lens and can blur the image that is reflected onto the retina, resulting in hazy vision.

Conductive problems: Sound waves are blocked as they travel from the outer ear canal to the inner ear, thus there is a decrease in hearing sensitivity.

Confabulation: Filling in words or memory gaps with information that is made up in order to compensate for memory loss.

Crystallized intelligence: The accumulation of knowledge over the lifespan.

Delirium: An acute, reversible state of agitation and confusion.

Dementia: A progressive and chronic deterioration of cognitive function.

Depression:A serious disorder that involves sadness, lack of interest, and other symptoms, such as hopelessness and decreased energy for at least 2 weeks.

Diabetic retinopathy: As a long-term effect of diabetes, the blood vessels to eyes grow weak and rupture, causing vision loss that may lead to blindness.

Dysarthria: Disturbed articulation.

Fine motor movement: Movement produced by the small muscle groups.

Fluid intelligence: The acquisition of new information.

Glaucoma: A collection of eye disorders characterized by a buildup of viscous fluid (aqueous humor) in the intraoccular cavity.

Gross motor movement: Movement produced by the large muscle groups.

Gustation: The chemical sense of taste.

IADLs: More complex tasks that include handling finances, preparing meals, or managing one's medications.

Macular degeneration: Neurons in the center part of the retina no longer function.

Olfaction: The chemical senses of smell.

Presbycusis: Latin for "old eyes"—the person cannot focus as clearly when objects are up close.

Sensorineural problems: Sound wave transmission is interrupted from the inner ear to the brain, most likely due to damage to the cochlea and/or auditory nerve.

Somatosensory system: Provides information about a variety of skin sensations including temperature, touch, or pain.

Tinnitis: A condition in which the person experiences a persistent ringing, buzzing, humming, roaring, or other noise in the ears that only the person can hear.

Verbal apraxia: Difficulty executing mouth and speech movements.

Visual acuity: The ability to identify objects.

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Chapter 5

Therapeutic Communication with Older Adults

Kathleen Stevens, PhD, RN, CRRN

LEARNING OBJECTIVES

At the end of this chapter, the reader will be able to:

1. Communicate effectively, respectfully, and compassionately with older adults and their families.
2. Identify physiological and psychosocial barriers to communication among older adults.
3. Recognize and use common augmentative and alternative communication devices.
4. Recognize the nurse's role and responsibility in the process of communication.
5. Utilize basic principles when communicating with older adults.
6. Identify and use strategies to overcome communication barriers.
7. Facilitate the communication of older adults with a particular focus on the use of assistive technology.

KEY TERMS

- Affective communications
- Aphasia
- Assistive technology
- Augmentative and alternative communication (AAC)
- Communication
- Dysarthria
- Instrumental communications
- Language

> "There may be no single thing more important in our efforts to achieve meaningful work and fulfilling relationships than to learn to practice the art of communication."
>
> —Max DePree

Communication is a core skill in the health care professions. We rely on our ability to communicate effectively to gather and share information as well as to build relationships with patients and their families. Learning and practicing the art of communication is key to our success as clinicians.

For many clinicians, communicating with older adults can be anxiety producing and fraught with challenges. These challenges may be associated with our memories of past difficulties communicating with older adults, be they family members, clergy, teachers, or neighbors, or they may be related to the physiological or psychosocial characteristics associated with aging. The purpose of this chapter is to review basic principles of communication and present strategies for communicating with older adults. This information should promote development of the skills needed to communicate effectively and promote optimal health for older adults.

Communication

The term *communication* is used frequently in our **language** and in our work. The term originates from the Latin word "commune," which means "to hold in common." By virtue of its origins, the word implies that communication is a process that involves more than one person. Communication is the process or means by which an individual relates experiences, ideas, knowledge, and feelings to another. Communication is a reciprocal process involving minimally two people, a sender and a receiver. Effective communication depends on the ability of both to engage in the process of sharing not merely words, but also concepts, emotions, and thoughts.

Physiologically, communication occurs as a result of a complex interaction of cognition, hearing, speech, and language centers. Cognition is essential to sending, receiving, and interpreting information in our communications. Cognitive centers in the brain are the basis for storing memory, developing emotion, forming judgments, and creating knowledge. From the time of birth, as we process new sensory information, cognitive centers in the brain are storing memories that will over time allow us to recognize patterns, forming complex thoughts and judgments. The cortex of the brain is the primary repository for cognition. Within the cortex are a multitude of interlinked storage areas that help store, retrieve, and make sense of messages coming from the world. The ability to store and use this knowledge is dependent upon many factors, including age, nutrition, activity, chemical balance, and the presence of any cerebrovascular disorders that could interfere with function.

The second cortical function that is important for communication is language production and the ability to speak. Language is the use of symbols or gestures that are common to groups and serve as a means of sharing thoughts, ideas, and emotions. Infants learn to assign specific sounds, known as words, to objects, activities, and ultimately emotions. This is often referred to as our primary language. As we age we learn not only to speak, but also to read and write the symbols associated with our primary language.

Throughout our lifetime we may learn a number of different languages. The ability to speak and understand multiple languages depends on frequency of use and environment. No matter how many languages we learn over the course of a lifetime, initial memories of our primary language serve as the foundation for all future learning. There may be many different dialects or meanings assigned to words within a language based on geography or age.

Cortical centers located in the parietal lobe of the dominant hemisphere, often referred to as the speech center, are the primary area of language development and speech production. Broca's area at the junction of the parietal and frontal lobes in the dominant hemisphere is responsible for speech production, whereas Wernicke's center at the intersection of the parietal and temporal lobes is the area of speech recognition. Damage to these areas will result in **aphasia,** an acquired loss or impairment of language. The most common cause of aphasia is the brain damage that occurs with a stroke.

Speech refers to oral communication of the sounds or words associated with language. In addition to the speech centers in the brain, speech production is dependent upon muscles and structures responsible for ventilation, phonation, and articulation. Important structures of speech are the diaphragm, intercostal muscles, larynx, vocal cords, tongue, and muscles of the mouth and face. When someone sustains damage to these structures, we say the individual has **dysarthria**. Dysarthria refers to a group of neuromuscular disorders that affect the speed, strength, range, timing, or accuracy of speech movements, which often result in reduced intelligibility of speech. The individual knows what he or she wants to say, but may have difficulty producing sounds or words that can be understood by others. Dysarthria can be present from birth as a result of cerebral palsy or other birth injuries, or may develop later in life as a result of facial injury, tumors, or paralysis associated with a stroke. Individuals with dysarthria may use **assistive technology** to augment or replace vocal communication.

Hearing-Assistive Devices

There are a variety of forms of assistive technology that help individuals with impaired speech communicate with the world around them. Assistive technology is "any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities" (Olson & DeRuyter, 2002, p. 4). Assistive technology can help individuals improve their mobility, communication, self-care, or vocational skills. An **augmentative and alternative communication** (AAC) system is "an integrated group of components, including symbols, aids, strategies and techniques used by individuals to enhance communication" (Henderson & Doyle, 2002, p. 127).

A speech language pathologist and an occupational therapist must conduct a thorough evaluation to assess the individual's abilities, limitations, and ability to effectively use a prescribed communication system. If a patient who uses an AAC system to communicate is admitted to your unit, it is important to learn from the patient or his or her caregiver how to use the device. Out of courtesy, ask permission from the individual with a disability prior to using or handling any assistive technology, and always be respectful by storing it in a place that is acces-

Box 5-1 Research Highlight

Aim: The purpose of this secondary analysis was to interpret narratives from a previous study to gain a better understanding of the common meanings and experiences of persons using AAC devices.

Methods: The researchers analyzed original data obtained from a Web-based focus group. Data came from online responses to questions at a conference Web site with free expression of dialogue by 16 participants, though responses were monitored. A research team used Heideggerian hermeneutics for the secondary analysis.

Findings: Six themes and one pattern emerged: "1) maintaining effective communication, 2) interacting in various situations, 3) AAC device-imposing limitations, 4) wading through prepackaged technology, 5) AAC device giving more than a voice, and 6) accepting the AAC device" (p. 215). Researchers summarized that "communication technology enables humanness" (p. 215).

Conclusions: AAC devices were more than technology to the users. They provided a means of remaining human and connected with the world through communicating with others. In addition, nurses should realize that users of such devices may require more time in use, but that these devices have personal meaning to users and allowed them to participate in society, certainly a goal of rehabilitation for those of any age.

Source: Dickerson, S. S., Stone, V. I., Pnachura, C., & Usiak, D. (2002). The meaning of communication: Experiences with augmentative communication devices. *Rehabilitation Nursing, 27*(6), 215–220.

sible to the patient and that provides the greatest degree of safety for the device. All nursing staff and health care professionals who work with the patient should learn to use the device and allow time for the patient to use the device to communicate. Staff should be aware of basic operations (e.g., battery charging) necessary to keep the unit in functional order and provide the patient with the opportunity to safely store and charge the device as needed.

Nonverbal Communication

Communication can be verbal or nonverbal. Nonverbal communication refers to behaviors or gestures that convey a message without the use of verbal language. Nonverbal communication can either enhance the delivery of a message or create a barrier to understanding. When a school crossing guard says "STOP" loudly and raises her hand with all five fingers extended, the individual is using a common nonverbal gesture to enhance the message delivered verbally. When we use eye contact in addition to a verbal greeting, we are using a nonverbal gesture along with words to welcome the individual. When similar verbal communication and nonverbal gestures are together, they can help us to deliver our message and improve communications.

Vocal nonverbal communication refers to the tone, pitch, speech rate, or fluency of verbal communication. In the example above, the school

crossing guard used pitch and tone to say "STOP" loudly, thereby catching our attention. What if the guard said the same word but in a normal voice—would it convey the same meaning? A nurse, directing a patient to a clinic exam room, who says in a loud, harsh tone, "Come here to this room," may be perceived by the patient to be stern and uninterested in him or her as a person. To communicate effectively we should be aware of our verbal and nonverbal vocal communications. What we say and how we say it are essential to therapeutic communication.

Nonvocal nonverbal communication refers to the use of facial gestures, body posture, eye contact, and touch as a means of communication. This chapter already mentioned how the use of eye contact along with a verbal word of welcome can enhance communication. Let's now picture the staff member looking intently at a chart, avoiding any eye contact or facial expression while greeting a new patient. In this example, the staff member's nonverbal communications speaks louder than his words. In this case, the patient may report the service was poor and staff was uninterested.

Nonverbal communication on the part of the patient is also an important factor in therapeutic communication in a health care setting. Look at **Case Study 5-1**. The staff nurse used a simple verbal comment to clarify the meaning of the patient's nonverbal behavior and determine her next action. A patient's nonverbal communication can provide nurses insight into the person's feelings and emotions. Learning to read the patient's nonverbal gestures is important for nurses.

Communication involves more than one person, so both the sender and the receiver must be attentive and demonstrate good communication skills. The goal of effective communication "is interpreting the messages and responding

Case Study 5-1

A student nurse on rounds enters a patient's room and finds an older woman sitting comfortably in a wheelchair in no apparent distress staring out the window with her back to the nurse. Is this patient inviting communication from the nurse? Based on the patient's position and posture, the nurse may elect to not speak or say anything fearing she might disturb the patient. Shortly the staff nurse enters the room and comments, "Mrs. Hale, are you waiting for someone? Can I do anything to help you get ready for a visit?" Mrs. Hale responds "I am waiting for my son. He is generally on time. I hope nothing bad has happened. I would like to go the bathroom before he arrives so I don't have to worry about that during his visit."

What is the nurse's most appropriate response in this situation? Should the nurse have done anything differently during the first visit to the room on rounds? If so, what? What nonverbal communication would the nurse expect to see from Mrs. Hale? What nonverbals should the nurse include in her care of this woman?

in an appropriate manner" (Caris-Verhallen, Kerkstra, and Bensing, 1997, p. 916). Through our communications we are not merely sending a message, but creating a shared meaning and understanding of an event, experience, or memory. Understanding and respecting the message of the sender is essential to effective communications. The receiver must be open to the ideas of the sender and provide respect during the conversation. Being silent, showing attentiveness, and listening to the sender are critical. Good listening starts with allowing time for conversation to occur; when we are rushed it is difficult to give the time and attention needed to truly understand the meaning associated with the words spoken. Understanding is enhanced when we share our interpretation with the sender, asking him or her to validate our interpretation or clarify misinterpretations. Try to approach each conversation with an open mind and a willingness to listen. Effective communication does not require agreement, but it does necessitate listening and taking into account the meaning of an idea, event, or experience described by the other person. Using communication and conversation we learn together and build a common bond through our understanding and respect for others.

Communication in Health Care

Communication is the essence of nursing. Good communication in health care is the foundation for optimal outcomes. Nurses use therapeutic communication skills to gather assessment data from patients and their families that is essential to diagnosis and care planning. We rely on our communication skills to provide information and education, and to encourage patients to change behavior and promote health. Nurses provide the caring word or touch that helps to relieve pain or distress.

Communication is a two-way process, so it is important to look at communication in health care from the consumer or patient perspective. Caris-Verhallen, Kerkstra, and colleagues (1997), in a review of the literature on the role of communication in nursing care of the older adult, discuss the distinction between instrumental or task-focused communications and **affective communication** from the perspective of the consumer. Instrumental or task-focused communications refers to behavior necessary for assessing and solving problems. Think about the conversations you have with patients that are focused on "caring for" the person. In these conversations, the primary interest of the health care provider is to gather information that will help them provide care for the person. These conversations may be formal and structured, such as the admission interview, a health assessment, discussion of advance directives, or patient–family education. In these conversations, the health care provider is initiating the conversation with a specific intent of gathering information from the patient that will be of assistance in diagnosing or treating patient problems. **Instrumental communications** may be informal conversations as well. Informal conversations include when the nurse asks the patient "What time do you want to eat?" or "What would you like me to order for your meal today?" Once again, the conversation is focused on the health care provider requesting information necessary for caring for the patient. In all these cases the conversation is generally initiated by the health care provider and the focus is a question about how best to care for the patient. Patients want to be cared for, but they often also want more—to be "cared about" as a person.

The second type of communication from the patient perspective is affective communication, which focuses on how the health care provider is caring about the patient and his or her feelings and emotions. Affective communications tend to be more informal and more difficult for health care providers. There is a greater degree of vulnerability for the health care provider in affective or psychosocial communications to develop an emotional or personal relationship with the patient. Look at the example in **Case Study 5-2**. By electing to spend time with the patient and allowing him time to talk about his life and emotions, the nurse conveyed her interest in knowing him as a person. During the conversation the nurse gained information that would be of assistance in care planning for the patient; however, this was not the primary intent of the conversation. From the patient's perspective the nurse showed interest in caring about him rather than caring for him.

Affective communication is important in long-term health care relationships, be it a nurse practitioner treating a patient with chronic illness in the clinic or a nurse working with a patient in long-term care or in the home. Think about ways a nurse can demonstrate caring about the person rather than merely caring for the person.

Communicating with the Older Adult

Communication with older adults can be quite rewarding, though at times it is fraught with challenges for both the sender and the receiver. Physiological changes associated with aging or secondary to chronic illness and disease can pose a barrier to communication. Common physiological changes associated with aging that interfere with communication include high-frequency

Case Study 5-2

A nurse walks into the day room of an assisted living unit and sees an older male resident playing cards alone. The nurse approaches the man and asks if he would like to play with a partner. The nurse proceeds to play a hand of cards with him. During the card game, the two converse about how the resident enjoyed playing cards with his wife while she was alive. The resident talks about how he misses his wife and the impact her death has had on him.

How did the nurse facilitate therapeutic communication in this case? What types of nonverbals would you expect to see on the part of the nurse? On the part of the older man? What does this situation remind us about with regards to communication? How might the nurse have handled this situation differently? What might have happened if the nurse had taken a different approach to conversation?

hearing loss, loss of dentition, reduced vital capacity, and reduced oral motor function. Chapter 6 provides more detailed information about these changes.

Communicating with others can be facilitated by paying attention to the basic principles of conversation. In her book, *Making Contact*, renowned family therapist and author Virginia Satir describes the basic principles for making contact and communicating with others. The basic principles are invite, arrange environment, maximize communication, maximize understanding, and follow through.

An invitation says to the other person that you are interested in them and sharing time with them. Health care providers can make a number of gestures that show respect and interest in the patient as a person. It can be as simple as arranging time for a conversation rather than doing an assessment on the run. As the new patient arrives on the unit, the nurse extends a greeting and conducts a triage assessment of the individual's health status while saying to the patient, "I will be coming to your room in about 15 minutes to meet with you and get some information to help us care for you here." Meanwhile, the nurse makes arrangements to minimize distractions during the admission interview.

Another inviting strategy is to greet the person by name and ask a nonthreatening open-ended question, thereby engaging the person in conversation. Think about the difference between an interrogation and a conversation—which is more pleasant? "Tell me about yourself and what brought you here today" invites the person to share information about themselves in a nonthreatening manner. See **Table 5-1** for other types of open-ended questions.

The second basic principle is to arrange an environment conducive to communication. The environment should be comfortable, provide privacy, and minimize distractions that could be barriers to communication, such as noise or poor lighting. At times, nurses invite patients to come into our space; for example, when we bring the patient to a treatment room in the clinic, the exam room often includes two chairs, which the health care provider can use to position themselves face to face with the interviewee in order to facilitate communication. Other times health care providers enter a patient's home or room in a long-term care setting, in which case we are entering the patient's territory and space. It is important to respect personal space and territory when arranging an environment conducive to conversation. When entering an older patient's space, simple gestures such as asking permission to sit or move the furniture conveys a sense of respect for the person. If the individual uses assistive equipment such as a wheelchair, cane, or communication device, ask permission before touching the equipment. It is equally important to ask where items should be placed prior to leaving the room to facilitate independence and provide safety.

The ideal position when communicating with a patient is one whereby the sender and receiver are seated 3–6 feet apart with chairs positioned to allow for eye-to-eye contact. When having a conversation with a person in a wheelchair, remember to pull up a chair and position yourself at equal height to the person. For patients with impaired vision, reposition the chair so you can be seen within their field of vision.

The third principle is to use communication strategies that maximize the individual's ability to understand the message. This includes using language and terminology that are familiar to the patient. It is our responsibility as the sender to use language appropriate for the receiver. In health care this is especially important when the

Table 5-1 Open-Ended Questions for Starting a Conversation

Ask questions about the past.	"Out of all the places you have lived, what made some better than others?"
	"Tell me about the places you have visited in your lifetime."
	"Tell me what kind of work you did and how you got into that field of employment." "I see you have been coming to this hospital for a number of years; can you tell me about these visits and how I can make your stay more comfortable?"
	"According to your records you have seen a number of our home health staff; can you tell me about services you have received?"
Ask personal questions.	"Tell me about your family."
	"I see you have grandchildren. Can you tell me about them and where they are located?"
	"How did you meet your husband? Tell me about your courtship and wedding."
Inquire about what is new and different.	"You have been coming to the clinic more often this year; can you tell me why and what changes have occurred?"
	"Tell me about your session with the physical therapist yesterday."
	"I see you have a new roommate; can you tell me how things are working out between the two of you?"
	"Tell me about the meals you are receiving."
Ask about their hopes and dreams.	"When you were younger what did you wish for?"
	"What do you wish for your family?"
Talk about facts or mutually shared events.	"Your physician just left; tell me about your conversation."
	"I saw you were watching the news at breakfast; tell me what's going on in the world today."
Ask how and why questions.	"I see you had quite a few children; how did you manage raising them?"
	"You are on a number of medications; tell me how you keep track of what to take and when."
	"What do you do to stay so active?"
Reference current events that are meaningful to most people.	"This summer is so hot. What's your favorite summer experience?"
	"Today is Valentine's Day. Tell me about a special valentine in your life."

Source: Adapted from Cox & Waller, 1991.

conversation involves health decision making or patient education. When an individual has difficulty understanding English it may be necessary to use an interpreter to present the information to the individual in his or her primary language. Many hospitals provide phone access to interpreters to improve communication between health care providers and consumers.

It is equally important to use age-appropriate language in communication. This is particularly important when communicating with older adults. Show respect by addressing the patient by his or her surname. Avoid familiar terms such as "honey," "bud," or "sweetie," which can be demeaning to the individual. During the initial interview, ask the patient how he or she prefers to be addressed and make note of this in the care plan or medical record. Our language should demonstrate respect for the individual as an adult.

Periodically ask the receiver to clarify what he or she is hearing as a means of ensuring accurate interpretation of your message. Mistakes occur when we make assumptions and fail to validate understanding. Take the case of the nurse who told her patient to take a medication prescribed TID "after each meal." Based on her physician's recommendation, the patient eats 5–6 small meals per day. Several days postdischarge the patient called for a prescription refill, and the nurse learned the patient was taking the medication after each meal, thus taking a minimum of five pills per day. To maximize understanding, ask the individual to repeat what you said or tell you what this means for them in their life. This simple step can be a life saver and helps you avoid communication errors.

The next principle is to maximize understanding. The most important skill to maximize understanding is to learn to listen. Learning to listen is essential to good communications. It is much easier to hear than it is to listen. Listening requires not only hearing the words spoken, but also understanding the meaning and context in which they are spoken. We must be open minded and provide opportunities for the individual to share their thoughts with us. It means allowing time to communicate and focusing attention on the person at the time of the conversation. Minimizing environmental distractions not only helps the individual with whom we are communicating, but also helps us maintain our focus.

The final principle is to follow up and follow through. Words backed by actions help develop trust. A relationship built on trust and concern for the welfare of others is critical to optimal health outcomes. These simple techniques can be applied to all of our communications.

Challenges in Communicating with Older Adults

Memory or Cognitive Deficits

Physiological changes associated with chronic illness have various presentations. Although the basic principles of communication still apply, they need to be modified to overcome barriers associated with the individual's disability. Cognitive damage may occur secondary to metabolic damage, stroke, or hormonal or degenerative disease. Chapters 7 and 11 provide information about screening and treatment for those with memory or cognitive problems. The mini-mental state exam (MMSE) is a reliable screening tool to assess cognitive function. Individuals with cognitive deficits secondary to diffuse cortical damage present with signs of dementia, including decreased attention span, memory loss, word finding problems, and perseveration. These individuals often have difficulty with conversation and are dependent upon others to initiate conversation. All too often the individual's posture and nonverbal communication conveys a sense of disinterest; thus, staff members are reluctant to initiate conversations. Early on in the disease process, conversation and the oppor-

tunity to share memories with others can be rewarding and energizing for the person. Regular conversation helps orient the individual to daily activities and creates a structure that promotes independence. Conversation that encourages thought and reflection can help keep the mind active. Just as exercise is important to the maintenance of physical function and mobility, mental exercise is equally important. **Table 5-2** outlines the basic principles of communication and strategies that benefit individuals with memory or cognitive deficits.

One of the most common problems affecting cognition and memory among the elderly is Alzheimer's disease. *The Rush Manual for Caregivers* (2002) offers several suggestions for making communication easier with those who have dementia. Dialogue should be encouraged for as long as possible. Use simple instructions and ask yes or no questions. Use cues from the person's behavior and reactions to decide whether to modify your approach. Be aware of one's own body language and tone of voice as well. Nurses may need to experiment with various types of communication, and approaches may need to be modified as the person's dementia progresses.

Speech Deficits or Impairments (Aphasia)

Aphasia is an acquired loss or impairment of language that occurs as a result of damage to the speech centers in the dominant hemisphere of the brain. There are many types of aphasia. Individuals with aphasia should be evaluated by a speech language pathologist who can provide instruction on the best strategies to use with each person. The most common types of aphasia are global aphasia, Broca's aphasia, and Wernicke's aphasia. Patients with a global aphasia typically have problems understanding language as well as producing speech. Language is typically nonfunctional in all modalities, speaking, reading, and writing. At times the individual may repeat a sound or word over and over. Although the individual may have difficulty speaking he or she may understand nonverbal gestures. It is important to include all patients with aphasia into social groups. Nonverbal gestures such as nodding toward the individual as you address them make the individual feel included.

Broca's aphasia is a nonfluent, agrammatic expressive aphasia. Individuals with Broca's aphasia typically have good auditory comprehension. They are able to understand what is said to them; however, they have difficulty producing intelligible speech. This is often quite frustrating for these individuals, because they know what they want to say but just can't get it out in words that have meaning to the receiver. Communication requires great patience. It is important to give the patient an opportunity to speak, because with time and therapy these individuals may make important gains in learning to communicate with others.

Wernicke's aphasia is a fluent aphasia. The individual is able to speak and produce language, although the speech may contain many odd words and sounds. Wernicke's aphasia is characterized by impaired auditory comprehension, so in this case the individual has great difficulty understanding what is said. Often he or she must rely on our nonverbal gestures to understand directions or questions.

It takes time and patience to communicate with individuals with aphasia. Nurses should structure activities and provide opportunities for these individuals to be engaged in some form of communication. Without opportunities to communicate with others individuals may withdraw

Table 5-2 Communicating with Individuals with Memory or Cognitive Deficits

Invite, Respect	Approach persons in a nonthreatening manner within their visual field. Sit quietly with the person and gently touch her hand. Be respectful of the patient's belongings. At times patients can get overly upset when an outsider touches their belongings, even basic items such as the tissue box or washcloth. Ask permission before moving objects. Show concern; stop and have a conversation—don't limit communication to times when you need information.
Environment	Post a few pictures, a calendar, or a daily schedule in the patient's room and use it to enhance conversation or promote recall. Sit so you are facing the person when speaking. Avoid a setting with a lot of sensory stimulation—it can be distracting to the person. Maintain eye contact; it will help keep the patient focused on you and the topic. Be respectful of space. If the individual chooses to get up and start walking mid-conversation, ask if you may follow.
Understanding	Speak in normal tones. Use age-appropriate language. Start with a familiar topic. Sometimes this means talking about the past, then through conversation bringing the person back to currect circumstances. Talk about people or events known to the person. This may mean referring to a deceased family member—the individual will let you know if this reference is comforting or distressing. For many individuals, pleasant memories from the past are a source of comfort. Orientation questions can be confusing and frustrating for the person, so rather than asking, "What's today's date?" consider asking, "Where's the calendar? Let's find today's date and mark it so we can find it later." Ask one question at a time. If the individual becomes upset or agitated, ease up and use distraction to change the topic or provide a period of quiet to allow a cool-down period.
Communication	Show interest in the person. If it is difficult to hear the person, gently ask his or her to speak louder. Provide time for conversation. Sometimes it will take awhile to get the message out. Sometimes it is easier for the person to tell a story than respond to a direct question. Don't laugh at responses, no matter how bizarre. Acknowledge your inability to understand and your frustration. It's probably a mutual feeling that both parties share.

and become socially isolated. The expertise of the speech therapist can be invaluable in helping patients to regain maximal communication patterns. See **Table 5-3** for tips regarding communicating with individuals with aphasia.

Speech Impairments (Dysarthria)

Dysarthria can occur secondary to a number of diseases. Even the loss of dentition that occurs with aging may predispose the individual to dysarthria. Individuals with dysarthria may be difficult to understand when they are speaking. Patience and practice are key to understanding individuals with dysarthria. As one gets accustomed to the language sounds it becomes easier to understand what the individual is trying to say. As the receiver it is important not to fake or pretend you understand. If the message is not clear, ask the individual to repeat, write, or communicate key words by using gestures. **Table 5-4** outlines the basic principles of communication and specific strategies that can be used to enhance communication with individuals with dysarthria.

Table 5-3 Communicating with Individuals with Aphasia

Invite, Respect	Include the individual in conversations. Look at the person as well as others during conversation. Treat the person as an adult. Provide time for the individual to speak. Getting the message across is more important than perfection. If you don't understand the person, politely say so: "I'm sorry, I can't understand what you are saying to me." Remember, frustration works both ways—it's always better to end the conversation with a smile rather than a frown.
Environment	Position yourself across from the person so they can see your face and you can see theirs.
Understanding	Speak naturally. Don't raise your voice—it won't help. Speak slowly using simple words and sentences. Use simple gestures to supplement your message. (This isn't a game of Charades or Pictionary—don't get carried away with your gestures.) Tell the patient one thing at a time. Announce topic changes and allow a few minutes before proceeding.
Communication	Provide time for the individual to speak. Look at the person and listen as they speak. If you don't understand, ask them to describe the word, use another word, say or write the first letter, point to the item, or describe the context for use. If the individual is able to write, ask them to write the word or use a word board to spell the word. Follow instructions from the speech language pathologist to improve the consistency of communication.

Table 5-4 Communicating with Individuals with Dysarthria

Invite, Respect	Remember, speech impairment is not related to intelligence. Use age-appropriate language. Make a note in the medical record if the individual uses an AAC device. If you know the individual uses an AAC device, store it in an accessible location so it is readily available for use.
Environment	A quiet environment with minimal distractions can help facilitate understanding. Face the person as they are speaking for facial cues and gestures that can enhance understanding.
Understanding Communication	Remember, the individual has no problem hearing you. Speak in a normal tone. Encourage the person to speak slowly and use simple sentences or single words. Allow time for the patient to respond. Don't try to complete their words or sentences. If there is no speech (aphasia, presence of an artificial airway, post-operatively after oral surgery): Assess the individual's yes/no reliability. Establish a system for yes/no communication (picture board or eye blink—1 = yes, 2 = no). Post rules for use at the bedside and in the medical record. Ask yes/no questions and allow the person time to respond. Confirm response before acting.

Visual Impairments

Individuals with visual impairments have no difficulty hearing or speaking; however, they will miss nonverbal communications. These individuals will have difficulty reading signs or relying on visual cues for orientation or education purposes. Printed materials may need to be large or translated into Braille to maximize understanding. **Table 5-5** outlines the basic principles of communication and techniques that can enhance communications with individuals with visual impairments.

Hearing Impairments

Individuals with hearing loss fall into one of two groups, the hearing impaired and those who are deaf. Individuals with a hearing impairment have a reduced ability to hear across the spectrum of sound. Typically, with age it becomes more difficult to hear soft, high-pitched sounds. Based on the severity of the damage, the individual may or may not elect to use a hearing aid. Unless the hearing loss poses a significant disability, the individual may elect to just get by without the hearing aid, at times much to the dismay of other family members. Many hearing-impaired elders have learned language and lived in an aural world so they tend to rely on lip reading, which matches oral gestures with sounds that are familiar to them. **Table 5-6** outlines the basic principles to use when communicating with individuals with hearing impairments. **Figure 5-1** displays different types

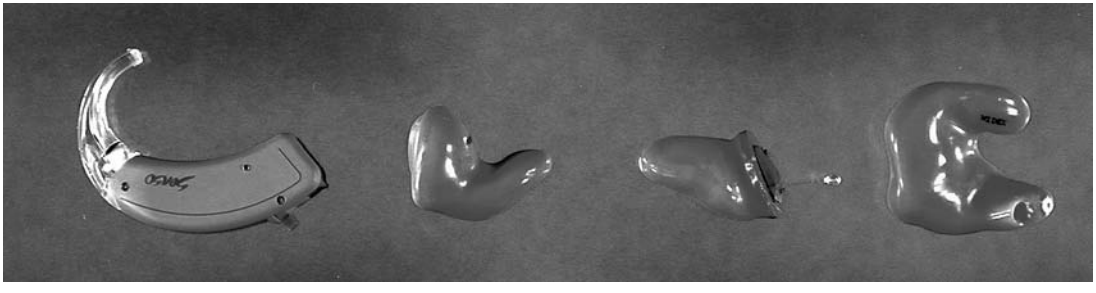
Table 5-5 Communicating with Individuals with Visual Impairments

Invite, Respect	Gently call out to the individual when entering the room and identify yourself and anyone with you in the room. If the individual can see shapes or outlines, stand where he or she can see you. The best location will vary—make a note on the medical record alerting other staff to the patient's needs.
Environment	Minimize distractions. Describe the environment and where you are located in relation to the person. Explain what you are doing, especially when you are moving and creating sounds in the room (e.g., storing dressing supplies in the closet, preparing equipment to draw blood, etc.). Make certain not to move frequently used objects.
Understanding Communication	Alert the person when you will be touching them. Oral communication with touch is more important than nonverbal gestures that they cannot see; use an appropriate tone of voice.

of hearing aids that may be used. Older adults who participate in an audiologic rehabilitation program and have positive social support have been shown to perceive less of a self-handicap than other hearing-impaired elderly (Taylor, 2003). This study by Taylor suggests that adults with hearing impairments would benefit from more formal training of them and their spouse or supportive family member related to facilitating long-term communication at home.

In contrast, individuals who are deaf cannot hear. They rely on one of several forms of sign language as their primary language. Sign language is a different language, much like German is different than the English language. Therefore, with few exceptions, qualified sign language interpreters should be used to ensure effective communication with hearing-impaired persons in emergency and other health care situations where the rapid exchange of accurate

Figure 5-1 Types of hearing aids.



Source: © Jones and Bartlett Publishers. Courtesy of MIEMSS.

Box 5-2 Resource List

American Speech-Language-Hearing Association: www.asha.org
Gallaudet University: www.gallaudet.edu
National Association of the Deaf: www.nad.org
Paralyzed Veterans of America: www.pva.org
Rehabilitation Institute of Chicago: www.RIC.org
The Deaf Resource Library: www.deaflibrary.org
Institute for Disabilities Research and Training: www.idrt.com
Deaf Empowerment: www.deafe.org
Canadian National Institute for the Blind: www.cnib.ca
ElderCare Online: www.ec-online.net/knowledge/articles/communication.html

Arnold, E. & Boggs, K. U. (2003). *Interpersonal relationships: Professional communication skills for nurses*. Philadelphia: WB Saunders.
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Table 5-6 Communicating with Individuals with Hearing Impairment

Invite, Respect	To get the attention of the person, touch the person gently, wave, or use another physical sign. Store assistive devices—hearing aid, notepad, and pen—within reach of the individual. Make certain any emergency alarms essential for safety have a light or visual alert to get the individual's attention in case of emergency. Allow time for the conversation.
Environment	If the individual uses a hearing aid, check to see whether he or she is wearing it and that it is turned on. Minimize background noise (turn off the radio or TV and close the door to minimize distractions from the hall). When speaking, face the person directly so he or she can see your lips and facial expressions. The preferred distance is 3–6 feet from the person.
Understanding	Speak clearly in a low-pitched voice; avoid yelling or exaggerating speaking movements—it won't help. Use short sentences. Don't hesitate to use written notes to maximize understanding and involve the person in the conversation.

Table 5-6 Communicating with Individuals with Hearing Impairment (continued)

Communication	Avoid chewing, eating, or smoking as you speak; they will make reading your speech more difficult. Keep objects (e.g., scarf, hands) away from your face when speaking. Allow the individual to be involved in making decisions—don't assume it takes too much time to ask. Provide time for the individual to speak. Ask questions to clarify the message; if needed, have the individual write a response.

information is critical. The use of qualified sign language interpreters communicates respect and ensures that deaf individuals and hearing health care professionals will be able to communicate with each other at a rate and level of complexity equal to, or as effective as, the communication rate of persons who speak directly to each other in the same language. Table 5-7 lists strategies that can be used to enhance communications with individuals who are deaf.

Summary

In conclusion, communication with older adults may present some unique challenges, including physical changes from normal aging as well as those associated with common disease processes. By using the basic techniques discussed in this chapter, nurses can facilitate effective communication with older adults within a variety of situations and settings.

Table 5-7 Communicating with Individuals Who Are Deaf

Invite, Respect	Note on the patient's record that the individual is deaf and may need an interpreter. Document if the individual uses American Sign Language or other assistive communication. Use a TDD phone or relay service to communicate with the person. Use an interpreter for conversations regarding health care decision making. To get the attention of the person, touch the person gently, wave, or use another physical sign. Store assistive devices—notepad and pen—within reach of the individual. Make certain any emergency alarms essential for safety have a light ot visual alert to get the individual's attention in case of emergency. Allow time for the conversation—functional as well as social.
Environment	When speaking, face the person directly so that he or she can see your lips and facial expressions. The preferred distance is 3–6 feet from the person.

(*continues*)

Table 5-7 Communicating with Individuals Who Are Deaf (continued)

Understanding	Don't hesitate to use written notes to maximize understanding and involve the person in the conversation. Avoid chewing, eating, or smoking as you speak—they will make reading your speech more difficult. When using an interpreter, face the individual not the interpreter—when asking as well as listening to a response. Be mindful of your nonverbal expressions during conversations—remember you are conversing with the person, not the interpreter.
Communication	Allow the individual to be involved in making decisions—don't assume it takes too much time to ask. Provide time for the individual to return communication and keep your focus on the person. Ask questions to clarify the message; if needed, have the individual write his/her response.

Critical Thinking Exercises

1. Mrs. Rodgers is a 68-year-old retired sales clerk. For many years she worked in the sewing and fabrics department at the local store. She is admitted after a fall. Her daughter reports her mother has been withdrawn and it is difficult to get her attention when she is watching television. According to the CT scan, it appears Mrs. Rodgers has an acoustic neuroma that may have contributed to her fall. Describe factors that may impact your communications with Mrs. Rodgers.
2. Dr. Knowles is an 85-year-old male who has had cerebral palsy since birth. He has dysarthria, which has gotten noticeably worse since he has lost his teeth. He is admitted to your unit with complaints of chest pain. The nursing assistant tells you "I just can't understand him, so I always say yes to his questions." What advice would you give to the nursing assistant to communicate better with Dr. Knowles?
3. Mr. Riley lives at home with his son and two high school–age grandchildren. According to the son, Mr. Riley has transient episodes of confusion and disorientation. He tends to get his son and grandson confused. On a home visit with Mr. Riley he acknowledges his confusion and comments, "No one talks to me so I guess I just drift off and get lost in time." What recommendations would you make to Mr. Riley's son?

Personal Reflections

1. Language and the meaning of words may change over time, so that as we age terms that were meaningful and relevant to our life at an early age are either no longer in use or have a different meaning to others not of our generation. (Example: "to mimeograph": A method of printing multiple documents that has since been replaced by Xerox or digital printing methods.)
   a. List terms used by older adults that are no longer used in daily language (e.g., phonograph).
   b. List terms that are part of your world but are unfamiliar to older adults (e.g., MP3, CD).
   c. Discuss how age differences between sender and receiver can have an impact on communications.
2. Think about a time you visited the dentist and your mouth was anesthetized for a dental procedure. Describe how you felt communicating with others. To what degree were they able to understand what you were trying to say? If you needed emergency care, could you communicate this need to others?

In this example you experienced a temporary or transient episode of dysarthria. You may have been frustrated communicating with others or relied on alternative means, such as writing, to communicate with others. Imagine if the anesthesia never wore off and your speech never improved. Describe how you would feel in this circumstance.

3. You are a nurse admitting an 87-year-old male accompanied by his wife who is in a wheelchair. List 10 nonverbal behaviors you may use during the admission interview to enhance communication.
   1. _____
   2. _____
   3. _____
   4. _____
   5. _____
   6. _____
   7. _____
   8. _____
   9. _____
   10. _____
4. Reflect back on your last day at clinical. What type of conversations did you have with your assigned patient? Were there opportunities for you to engage in an affective conversation with your assigned patient? Did you observe other staff members engaging patients in affective communications? List barriers in health care that limit staff engaging in affective conversations with patients.
5. Call local hospitals and ask for information on language translation services. Ask for information on the policy for use of interpreter services at the facility.

Glossary

Affective communications: More informal communications that focus on how the health care provider is caring about the patient and his or her feelings or emotions

Aphasia: Difficulty with the use of language

Assistive technology: Any piece of equipment or technology that helps improve the function of individuals with functional limitations

Augmentative and alternative communication (AAC): An integrated group of components or assistive devices and strategies that help individuals improve communication

Communication: The act of giving and/or receiving information; can be verbal or nonverbal

Dysarthria: Impairments in the muscles used in speech

Instrumental communications: Task-focused communications related to assessing and solving problems

Language: Symbols, sounds, and gestures used by a common group to share thoughts, ideas, and emotions

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Section 3

Assessment (Competencies 5–8) and Technical Skills (Competencies 9, 10)

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Chapter 6

Review of the Aging of Physiological Systems

Janice M. Plahuta, PhD
Jennifer Hamrick-King, PhDc

LEARNING OBJECTIVES

At the end of this chapter, the reader will be able to:

1. Describe the aging process of each physiological system.
2. Distinguish between intrinsic aging and age-related disease.
3. Describe how the aging process of each physiological system correlates with the functional ability of the older adult.
4. Explain how the aging process of one system interacts with and/or affects other physiological systems.
5. Acknowledge that not every aspect of every physiological system changes with age.
6. Recognize that aging changes are partially dependent upon an individual's health behaviors and preventive health measures.

KEY TERMS

- acquired immunity
- actin
- adrenal cortex
- adrenal glands
- adrenal medulla
- adrenoceptors (α)
- adrenoceptors (β)
- adrenocorticotropic hormone (ACTH)
- aldosterone
- alveoli
- amino acid neurotransmitters
- andropause
- anemia
- anorexia of aging
- antibodies
- antigen
- arteries
- atria
- autoimmunity
- autonomic nervous system
- B cells

- barorecepter
- baroreflex
- basic multicellular unit (BMU)
- calcitonin
- cardiac output
- cartilaginous joints
- catecholamines
- $CD34^+$ cells
- cell-mediated immunity
- chemoreceptors
- cholinergic neurons
- chronological aging
- clonal expansion
- colon
- complement system
- cortical bone
- corticotropin-releasing hormone (CRH)
- cortisol
- cytokines
- dehydroepiandrosterone (DHEA)
- dermis
- detrusor
- diaphragm
- diastole
- dopaminergic system
- elastic recoil
- epidermis
- epinephrine
- erythrocytes
- esophagus
- fast-twitch fibers
- follicle-stimulating hormone (FSH)
- forced expiratory volume (FEV)
- free radicals
- gallbladder
- gastrointestinal immunity
- glomerular filtration rate
- glomeruli
- glucagon
- glucocorticoids
- glucose tolerance
- GLUT4
- gonadotropin-releasing hormone (GnRH)
- growth hormone (GH)
- hematopoiesis
- homeostasis
- hormones
- humoral immunity
- hypogeusia
- hypophysiotropic
- hypothalamic-pituitary-adrenal (HPA) axis
- immovable joints
- immunosenescence
- inflammatory response
- inhibin B
- innate immunity
- insulin
- insulin resistance
- islets of Langerhans
- keratinocytes
- killer T cells
- Langerhans cells
- leukocytes
- lipofuscin
- liver
- luteinizing hormone (LH)
- macrophage
- mechanoreceptors
- melanin

- melanocytes
- melatonin
- menopause
- mineralcorticoids
- monoaminergic system
- motor unit
- muscle quality
- muscle strength
- myocardial cells
- myofibril
- myosin
- natural killer (NK) cells
- nephrons
- nerve cells
- neurogenesis
- neurotransmitter
- nocturia
- norepinephrine
- olfaction
- osteoblast
- osteoclast
- osteocyte
- pancreas
- parathyroid gland
- parathyroid hormone (PTH)
- pharynx
- photoaging
- pineal gland
- plaques
- plasma cell
- plasticity
- pluripotent stem cells
- presbycusis
- presbyopia
- replicative senescence
- reproductive axis
- sarcomere
- sarcopenia
- sarcoplasmic reticulum
- skeletal muscle
- slow-twitch fibers
- stem cell progenitors
- subcutaneous layer
- suppressor T cells
- synapses
- synaptogenesis
- synovial fluid
- synovial joint
- synovium
- systole
- T cells
- tangles
- T-helper cells
- thrombocytes
- thyroid
- thyroid-stimulating hormone (TSH)
- thyroxine (T4)
- total lung capacity
- trabecular bone
- triiodothyronine (T3)
- ureters
- urethra
- vasopressin
- ventilatory rate
- ventricles
- vital capacity

Without the physiological changes of aging we might never say that a person ages. The general population's concept of aging is generally, and almost instinctively, characterized by changes in physical appearance, functional decline, and chronic disease. All of these characteristics are the result of physiological change. Even the psychological and social changes associated with aging, such as depression and social withdrawal, are often rooted in changes in the structure and function of the body's physiological systems. Thus, it could be argued that the physiology of aging is true aging.

Aging processes that occur in one physiological system can directly or indirectly influence other physiological systems. Thus, although it is relatively easy to focus on changes in only one physiological system, a broader scope is necessary to truly understand the influences and consequences of aging on physiological structure and function. This is especially true given that people are now living longer and for longer periods of time in that stage of life that is currently considered to be old age. Although each cohort ages differently, general aging changes tend to remain stable. In this chapter we will review the aging process of each of the body's major physiological systems. We ask, however, that the reader remain mindful that physiological aging is an extremely individual process and that how the body ages is greatly affected by a person's genetic makeup, health behaviors, and availability of resources.

The Cardiovascular System

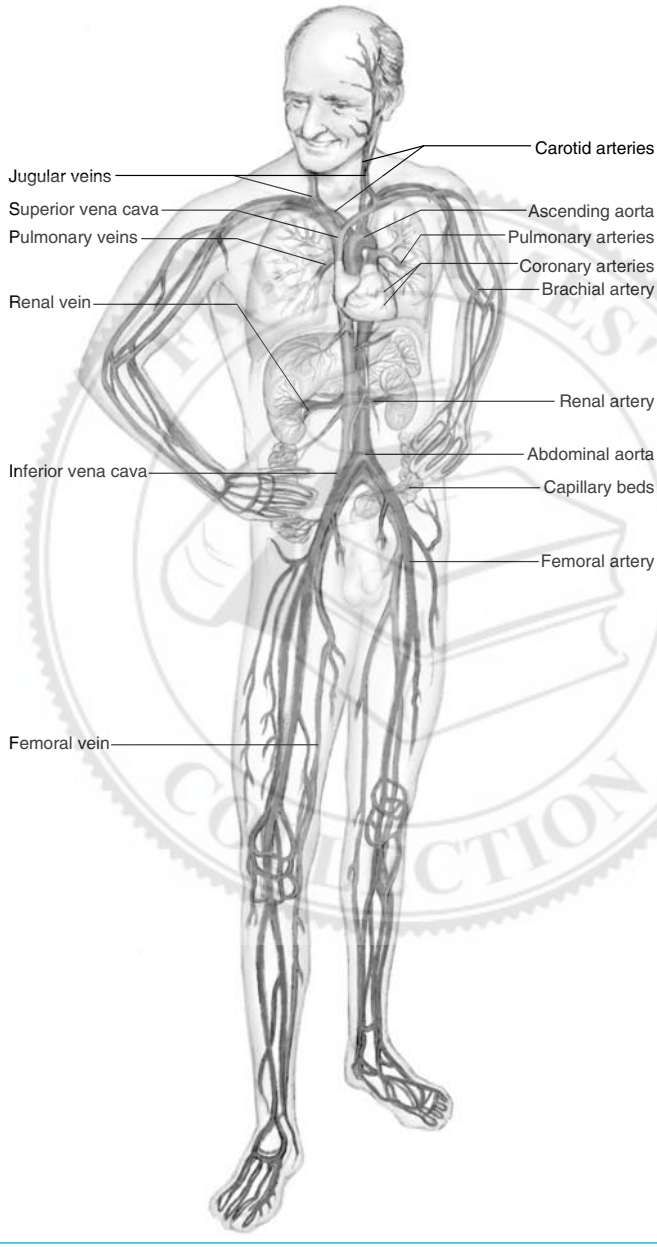
The heart and associated vasculature connects to every organ system in the body, maintaining oxygen levels, supplying nutrients, and filtering toxins. The structural and functional abilities of the cardiovascular system are crucial to sustaining the human body. Age-related changes to the cardiovascular structure and function will be evaluated in this section.

Overview of the Cardiovascular Structure and Function

The heart contains four chambers consisting of the two upper atria and the two lower ventricles (Digiovanna, 2000). Blood from the venous system enters the two **atria**. Oxygenated blood from the lungs enters the left atrium and deoxygenated blood from the body enters the right atrium. Blood then flows into the **ventricles**, from which it is pumped into the aorta and connected **arteries** (Digiovanna, 2000). The left ventricle expels oxygen-rich blood into the aorta for delivery to the entire body, excluding the lungs. The right ventricle expels oxygen-poor blood into pulmonary arteries that carry the blood to the lungs for reoxygenation (Digiovanna, 2000; Moore et al., 2003). When ventricles contract, blood fills and stores in the arteries during **systole**, or peak blood pressure. Once the ventricles relax during **diastole**, or low rate blood pressure, blood is propelled into the capillaries (Digiovanna, 2000; Pugh & Wei, 2001; Moore, Mangoni, Lyons, & Jackson, 2003).

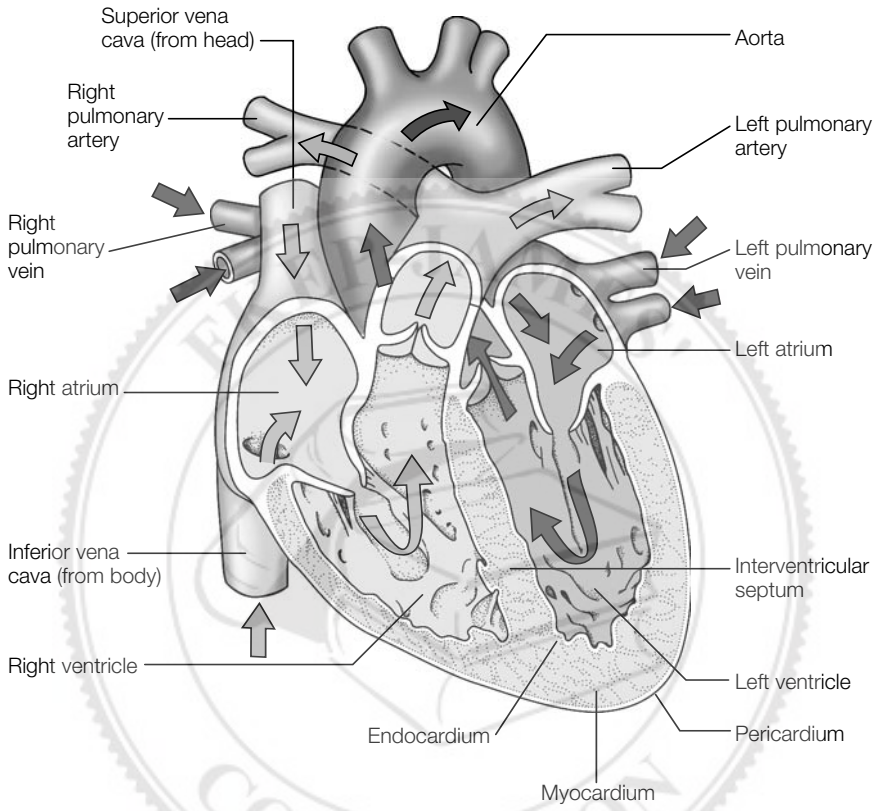
Larger arteries are associated with the structure and function of the heart whereas smaller arteries and arterioles are associated with systemic structure and function. The arterial system as a whole is responsible for the qualities of pressure and resistance that are characteristic of the cardiovascular system (Moore et al., 2003). The veins carry over half of the total blood in the cardiovascular system and are associated with the qualities of volume and conformity (Moore et al., 2003). **Figure 6-1** illustrates the arterial and venous systems within the body and organ systems while **Figure 6-2** demonstrates the

Figure 6-1 The cardiovascular system.



Source: Robert L. Clark, *Anatomy and physiology: Understanding the human body.* Sudbury, MA: Jones and Bartlett Publishers, 2005.

Figure 6-2 Blood flow through the heart.



Source: Daniel D. Chiras, *Human biology* (5th ed.). Sudbury, MA: Jones and Bartlett Publishers, 2005.

structural overview of the heart and the path of blood flow into and out of the heart.

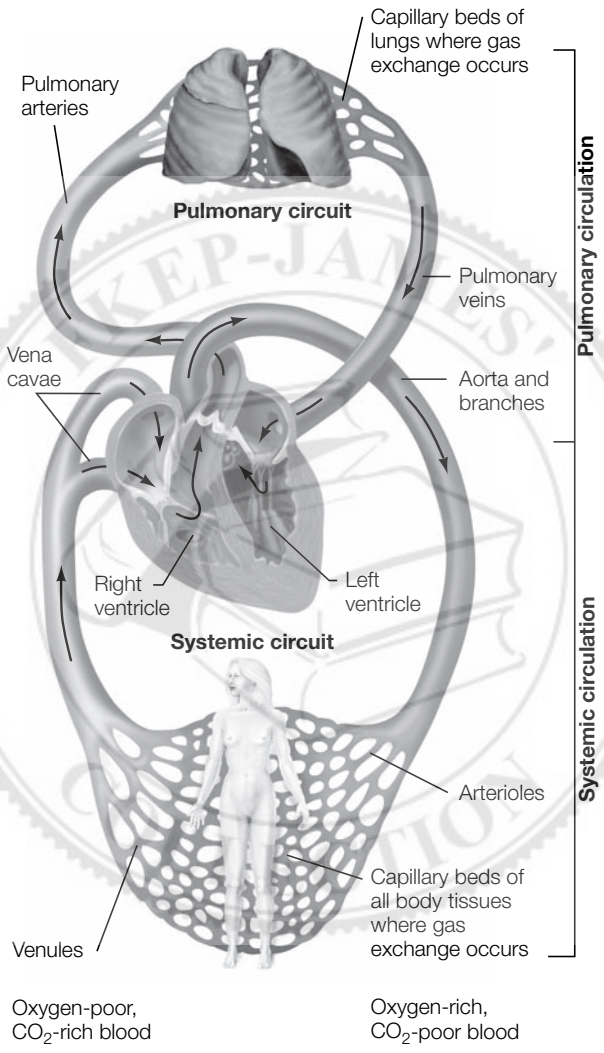
The main function of the cardiovascular system is to maintain homeostasis by transferring oxygen, nutrients, and hormones to other organ systems. The cardiovascular system also provides defense mechanisms through lymph nodes and white blood cells. In addition, this physiological system regulates body temperature as well as acid-base balance within the range of pH 7.35 to 7.45 (Digiovanna, 2000). **Figure 6-3** illustrates the pathway of oxygen-rich and oxygen-depleted blood circulation to corresponding organs and body areas.

Aging Changes in Cardiovascular Structure

Cardiac Aging

Enlargement of heart chambers and coronary cells occurs with age, as does increased thickening of heart walls, especially in the left ventricle (Priebe, 2000; Pugh & Wei, 2001; Weisfeldt, 1998). This enlargement and thickening causes a decline in

Figure 6-3 The circulatory system.



Source: Daniel D. Chiras, *Human biology* (5th ed.). Sudbury, MA: Jones and Bartlett Publishers, 2005.

ventricle flexibility (Pugh & Wei, 2001) and an overall increase in heart weight of about 1.5 grams/year in women and 1.0 gram/year in men measured from age 30 to age 90 years (Ferrari et al., 2003; Lakatta, 1996). Ventricles in the heart also begin to thicken and stiffen in correlation with continued steady production of collagen. In addition, there is a decline in the number of **myocardial cells** and subsequent enlargement of the remaining cells (Ferrari et al.,

2003; Olivetti, Melessari, Capasso, & Anversa, 1991; Pugh & Wei, 2001). Early studies found that the total number of myocardial cells declines by approximately 40% to 50% between the ages of 20 and 90 (Olivetti et al., 1991). However, recent investigations have concluded that women maintain myocardial cell numbers with age (Olivetti et al., 2000).

VASCULAR AGING

Aged arteries become extended and twisted. Alterations also occur in endothelial cells, and arterial walls thicken due to increased levels of collagen and decreased levels of elastin (Ferrari et al., 2003; Lakatta, 1999b; Virmani et al., 1991). With age, large arteries begin to stiffen, leading to hypertension pathophysiology characterized by increased blood velocity from the aorta to the systemic arterial system (Moore et al., 2003; Weisfeldt, 1998). Variable levels of arterial stiffness occur depending on differential changes in elastin and collagen levels. The level of arterial stiffness also depends on whether the affected arteries are central elastic arteries or peripheral muscular arteries (Pugh & Wei, 2001; Robert, 1999). Peripheral arteries can show increased stiffness due to accumulating mineral (calcium), lipid, and collagen residues (Lakatta, 1993a; Richardson, 1994; Robert, 1999). Although arteries stiffen due to alterations in elastin and collagen, arterioles undergo atrophy, affecting their ability to expand with pressure alterations (Richardson, 1994).

Although the aorta and other arteries begin to stiffen with age, the left ventricle pumps the same amount of blood. This combination of arterial stiffening and stable blood flow results in increased wave velocity of blood traveling toward the arterial system and toward the aorta. If blood returns to the aorta before the aortic valve can shut there is a resultant increase in systolic and arterial blood pressure and a decrease in diastolic pressure (Carroll, Shroff, Wirth, Halsted, & Rajfer, 1991; Lakatta, 1993a; Schulman, 1999; Weisfeldt, 1998). The flexibility of the aorta remains greater in women than in men until menopause, at which time aortic flexibility declines. However, estrogen replacement recovers some of the lost aortic expandability (Hayward, Kelly, & Collins, 2000; Rajkumar et al., 1997).

Overall vascular tone tends to decline with age due to deterioration in endothelium regulation of vascular relaxation (Pugh & Wei, 2001; Quyyumi, 1998). All four cardiac valves increase in circumference in older adults with the greatest increase occurring in the aortic valve. In addition, calcium deposits accrue in the valves and may lead to stenosis (Pugh & Wei, 2001; Roffe, 1998; Tresch & Jamali, 1998).

In the cardiac conduction system, the sinoatrial (SA) node demonstrates some fibrosis as well as loss of pacemaker cells to approximately 10% of those observed at age 20 (Lakatta, 1993a; Wei, 1992). Also with age, the atroventricular (AV) node may be affected by nearby calcification of cardiac muscle (Pugh & Wei, 2001). In contrast to those of the arterial system, age-related changes to the venous system have not been well described in the literature (Moore et al., 2003). Table 6-1 summarizes cardiovascular age-related structural changes.

CARDIOVASCULAR AGING MECHANISMS

Finding the mechanism responsible for the aging of the cardiovascular system could lead to interventions and therapies aimed at reducing the age-associated physiological factors that alter cardiovascular structure and functioning. Some potential mechanisms include free radicals, apoptosis, inflammatory processes, advanced glycation end products, and gene expression (Pugh

Table 6-1 SUMMARIZATION OF CARDIOVASCULAR STRUCTURAL AND FUNCTIONAL CHANGES THAT OCCUR WITH AGE

Structural changes with age	Decreased myocardial cells, decreased aortic distensibility, decreased vascular tone
	Increased heart weight, increased myocardial cell size, increased left ventricle wall thickness, increased artery stiffness, increased elastin levels, increased collagen levels, increased left atrium size
Functional changes with age	Decreased diastolic pressure (during initial filling), decreased diastolic filling, decreased reaction to β-adrenergic stimulus
	Increased systolic pressure, increased arterial pressure, increased wave velocity, increased left ventricular end-diastolic pressure, elongation of muscle contraction phase, elongation of muscle relaxation phase, elongation of ventricle relaxation
No change with age	Ejection fraction, stroke volume, cardiac output, overall systolic function

& Wei, 2001). Free radicals have been implicated in the overall aging process of the body, as described in Chapter 3 and also mentioned in this chapter under "The Aging Brain." The presence of **lipofuscin**, a brown pigment found in aging cells, relates to oxidative mechanisms. In combination with mitochondrial dysfunction, lipofuscin may result in the increased production of free radicals (Roffe, 1998; Wei, 1992).

Increased levels of free radicals can foster apoptosis, or cell death. Due to the very limited regenerative properties of cardiomyocytes, or heart cells, apoptosis can have detrimental effects on cardiovascular structure and functioning (Pugh & Wei, 2001). The proposed triggers for induction of apoptosis include elevated levels of noradrenaline and initiation of the renin-angiotensin system with age (Sabbah, 2000). Another possible trigger for apoptosis is gene expression, which causes changes in the messenger RNA (mRNA) associated with the sarcoplasmic reticulum and related enzyme ATPase (Lakatta, 1993a). These mRNA changes lead to both qualitative and quantitative alterations in the **sarcoplasmic reticulum** and ATPase. These alterations, in turn, lead to functional changes in relaxation of the heart and diastolic filling (Lakatta, 1993a; Lompre, 1998; Pugh & Wei, 2001). Aging mechanisms associated with the heart continue to be researched in depth, hopefully leading to new insights in the near future.

Aging Changes in Cardiovascular Function

CARDIAC AGING

According to several studies, the ability of the heart to exert force or to contract does not change with age (Gerstenblith et al., 1997; Rodeheffer et al., 1984; Weisfeldt, 1998). At rest, the aging

heart adapts and maintains necessary functioning quite efficiently (Pugh & Wei, 2001). Although the ability of the cardiac muscle to exert force does not change with age, the actual muscle contraction as well as the relaxation phase does elongate with age (Lakatta, 1993a; Lakatta, Gerstenblith, Angell, Shock, & Weisfeldt, 1975; Roffe, 1998; Schulman, 1999). The prolonged contraction and relaxation phases with age correlate with extended release of calcium as well as decline in calcium reuptake (Roffe, 1998).

Ventricles also experience prolonged relaxation due to age-related declines in the sarcoplasmic reticulum pump and associated enzyme ATPase, which produces energy for the cardiovascular system (Lompre, 1998; Pugh & Wei, 2001). The left atrium in the heart enlarges, contributing to functional changes in the filling rate. Furthermore, research has demonstrated that increased arterial stiffness along with the extended relaxation period leads to increased left ventricular end-diastolic pressure. This is demonstrated by a decline in pressure at the beginning of diastolic filling and an increase in pressure during late diastolic filling (Kane, Ouslander, & Abrass, 1999; Lakatta, 1993a; Miller et al., 1986; Pugh & Wei, 2001; Roffe, 1998). With age, diastolic filling declines at a rate of approximately 6% to 7% each decade both during exercise and at rest, but diastolic heart failure rarely occurs (Schulman, 1999). Increased left ventricle mass has been correlated with age-related declines in initial diastolic filling (Salmasi, Alino, Jepson, & Dancy, 2003). The increase in left ventricular mass correlates with increased total blood flow and elevated systolic blood pressure (Weisfeldt, 1998). However, no age-related change occurs in ejection fracture, stroke volume, or cardiac output (Ferrari, Radaelli, & Centola, 2003; Gerstenblith et al., 1997; Rodeheffer et al., 1984).

VASCULAR AGING

Aging does not appear to change the overall maximum capacity, the maximum vasodilation, or the perfusion of coronary vessels (Weisfeldt, 1998). However, resistance increases with age in the aorta, arterial wall, and vascular periphery. In addition, blood viscosity increases between the ages of 20 and 70 years (Morley & Reese, 1989). Cardiovascular symptoms of hypertension parallel the usual aging changes seen in older adults. Such symptoms, however, are exhibited at younger ages as well and are sometimes exaggerated. These differences have led to use of the term *muted hypertension* to describe cardiovascular aging changes (Lakatta, 1999b). Other changes such as moderate accumulation of cardiac amyloid and lipofuscin do not appear to alter functional abilities, but they are present in approximately half of individuals over age 70, and elevated levels could produce degenerative changes (Pugh & Wei, 2001). No age-related changes occur in blood-tissue exchange via the capillaries, suggesting a possible compensatory mechanism such as capillary thickening (Richardson, 1994).

AUTONOMIC NERVOUS SYSTEM AGING EFFECTS

A few of the age-related changes in the cardiovascular system occur in the **autonomic nervous system**. These changes include decreased reaction of the entire system, myocardial and vascular, to β-adrenergic stimulus as well as reduced baroreflex activity relating to an imbalance in neuroendocrine control (Lakatta, 1999b; Philips, Hodsman, & Johnston, 1991; Pugh & Wei, 2001; Weisfeldt, 1998). Norepinephrine concentrations increase with age, causing overactivation of the sympathetic nervous system. This overactivation subsequently leads to overstimulation of **β-adrenoceptors**, even to the

point of desensitization (Esler, Kaye, et al., 1995; Lakatta, 1993b, 1999a; Moore et al., 2003). With usual functional abilities, however, stimulation of the β-adrenoceptors triggers vessel dilation. In contrast, **α-adrenoceptors** that control vessel constriction remain stable with age (Priebe, 2000; Weisfeldt, 1998). Reduced arterial **baroreflex** activity, which controls peripheral vessels, has been correlated with several changes including arterial stiffening, neural modifications, and decreased stimulation of **baroreceptors** (Hunt, Farquar, & Taylor, 2001). These changes in baroreflex activity can lead to impaired sympathetic nerve response and resistance in peripheral vessels. As a result, blood pressure becomes unstable and hypotension may result (Ferrari et al., 2003). Table 6-1 summarizes age-associated changes in the functional abilities of the cardiovascular system.

Exercise and Aging

When older adults exercise, the cardiovascular response is different than the response of younger individuals. Cardiovascular condition during exercise is usually measured using maximum oxygen consumption (VO_{2max}), which equals the sum of **cardiac output** and systemic oxygen reserve. VO_{2max} shows age-related declines of around 10% per decade beginning in the second decade of life and reductions of around 50% by age 80 (Aronow, 1998; Maharam, Bauman, Karlman, Skolnick, & Perle, 1999). Cardiovascular reserve is best measured using maximum cardiac output, which is equal to heart rate multiplied by stroke volume during exercise (Fleg, 1986). For example, with age the increased heart rate and contractility usually associated with exercise become less pronounced; however, opposition to blood flow increases (Weisfeldt, 1998). With these changes an overall decline in cardiac function and cardiac output is observed with initiation of exercise (Pugh & Wei, 2001; Weisfeldt, 1998).

A number of individuals from the Baltimore Longitudinal Study, aged 20 to 80 years and without heart disease, participated in an exercise program so that their cardiovascular functioning could be assessed (Rodeheffer et al., 1984). The researchers conducting this study observed and concluded that when older adults began to exercise their heart rate did not respond as well, a greater end systolic volume existed, and heart contractility declined. However, as these older adults continued to exercise, the end diastolic volume increased, producing greater stroke volume and ending with an unchanged cardiac output. Other research has shown similar conclusions with exercise including decreased heart rate and contractility, decreased peak heart rate and ejection fraction, decreased end-systolic volume, increased end-diastolic volume, and preserved stroke volume, further supporting the findings of increased left ventricle end-diastolic volume and maintained cardiac output during exercise (Fleg et al., 1995; Kane et al., 1999; Lakatta, 1993a, 1999a; Roffe, 1998; Wei, 1992). Exercise also increases vascular resistance and elevates both systolic and diastolic pressure (Lind & McNicol, 1986). Salmasi and colleagues (2003) conducted a research study involving 55 patients less than 50 years of age and 45 patients greater than 50 years of age and evaluated them for left ventricle diastolic function at rest and during isometric exercise. These researchers concluded that degeneration in left ventricle diastolic functioning occurred in the 50 year and older group both at rest and during isometric exercise due to ventricle stiffening leading to decreased diastolic filling initially (Salmasi et al., 2003). Conclusions on cardiovascular change with exercise must be

Table 6-2 LIFESTYLE INTERVENTIONS TO MAINTAIN OR IMPROVE PHYSIOLOGICAL FUNCTIONING IN AGING

Physical activity	1. Do some type of exercise at least 30 minutes a day and more involved exercise 3–5 days per week. 2. Include cardio training, weight-bearing exercise, resistance, balance training, and flexibility exercise.
Nutrition	1. Low calorie diet 2. Low fat diet 3. Low cholesterol diet 4. Low sodium diet 5. At least five fruits and vegetables per day 6. Plenty of whole grains 7. Eight glasses of water a day
Vitamins and minerals	1. Vitamins: B_6, B_{12}, D, K, A, C, E, beta carotene, and folic acid 2. Minerals: selenium, calcium, and iron
Examples of self-report assessment measures of physical activity and nutrition status	1. The Physical Activity Scale for the Elderly (PASE) (Washburn et al., 1993) 2. Nutritional Risk Index (Wolinsky et al., 1990) 3. The DETERMINE Screen (Nutrition Screening Initiative, 1992)
Prevalence rates of weight, dietary intake, and physical activity in individuals age 65 and over	1. Obese: Men—27%, Women—32% Age 65–74: Men—32%, Women—39% Age 75 and over: Men—18%, Women—24% Overweight: Men—73%, Women—66% Underweight: Men—1%, Women—3% 2. Diet (Healthy Eating Index): 19% good diet, 67% needed improvement, 14% poor diet *low score on daily fruit and dairy servings *high score on variety of food and cholesterol intake 3. Nonstrenuous physical activity: 21% total for 65 and over; Regular strenuous physical activity: Age 65–74: 26% Age 75–84: 18% Age 85 and over: 9%

Source: Drewnowski & Evans, 2001; *Federal Interagency Forum on Aging-Related Statistics,* 2004; McReynolds & Rossen, 2004; Topp et al., 2004)

evaluated carefully in order to discern age-associated alterations across time and across individuals (**Table 6-2**).

Although structural and functional changes occur in the cardiovascular system with age, some changes remain variable across time and across

individuals. Some research studies comparing cardiovascular function across different age cohorts do not take into account nutrition practices, exercise regimens or lack thereof, and other effects such as the lifestyle of older adults across time and space compared to younger individuals (Lakatta, 1999b). For example, older adults today often will say they grew up on a farm with large meals and a lack of concern for fat content; however, younger individuals today are very health conscience with tremendous focus on fat and calories. Nutrition and exercise habits as well as other health-related practices continually change over time, which brings up the question of how comparable younger individuals are to older individuals in terms of cardiovascular functioning.

The Respiratory System

The respiratory system refers to the parts of the body involved in breathing. This system works in close collaboration with the cardiovascular system to provide the body with a continuous supply of oxygen necessary to produce energy and to eliminate unwanted carbon dioxide. This gaseous exchange is vital to life and, hence, proper functioning of the respiratory system and its constituent parts is critical to human survival.

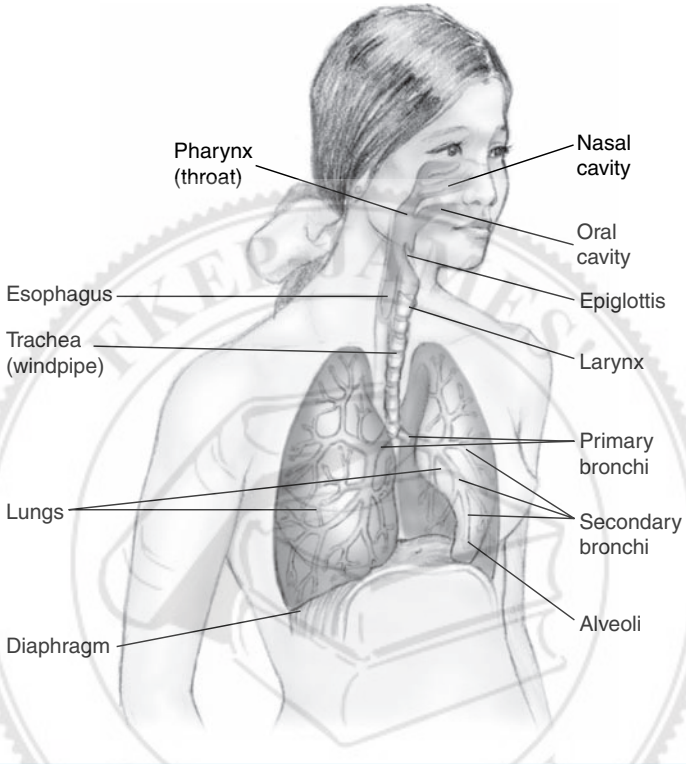
Structure and Function of the Respiratory System

The respiratory system is composed of the mouth, nose, pharynx, trachea (or windpipe), and lungs, as well as the diaphragm and rib muscles. During respiration (**Figure 6-4a**), oxygen first passes through the mouth and nasal passages where it is filtered of any large contaminants. It then enters the **pharynx** where it absorbs water vapor and is warmed. The oxygen then flows through the trachea, a tube extending into the chest cavity, and into two smaller tubes called the bronchi, each of which splits into tubes called the bronchioles. Oxygen flows through the bronchi into the bronchioles and then into the lungs through many smaller tubes called alveolar ducts. From the alveolar ducts, oxygen travels into tiny, spongy air sacs called **alveoli** (**Figure 6-4b**), of which there are approximately 600 million in the average, healthy adult lung (Krauss Whitbourne, 2002). The alveoli are the functional units of the lungs and the site of gas exchange. Once in the alveoli, oxygen is diffused through the capillaries into the blood. The blood then carries the oxygen to the cells of the body. Carbon dioxide exits the body through the same, albeit reverse, pathway through which oxygen entered.

The lungs are composed of elastic tissue that allows them to expand and contract during inhalation and exhalation, respectively. The measure of the lungs' ability to expand and contract is known as **elastic recoil**. The alveoli are also composed of elastic tissue, granting them the same expansion and contraction properties as the lungs themselves. The more the alveoli can expand and contract, the more oxygen they can bring in and the more carbon dioxide they can expel. The alveoli also secrete a substance known as surfactant, which reduces the surface tension within the lungs. This reduction in surface tension helps to keep the lungs from collapsing after each breath. Hence, surfactant aids in maintaining lung stability.

Respiration is highly controlled by respiratory muscles, including the **diaphragm** and rib muscles. The diaphragm is a sheet of muscles located across the bottom of the chest. Respiration occurs with contraction and relaxation of the diaphragm and the rib muscles. To allow for the intake of oxygen, the rib muscles contract and push the ribs up and out while the diaphragm contracts and is pulled downward.

Figure 6-4(a) The respiratory system.



Source: Robert E. Clark, *Anatomy and physiology: Understanding the human body.* Sudbury, MA: Jones and Bartlett Publishers, 2005.

These muscle contractions increase the volume of the chest cavity and reduce pressure within the cavity. The change in volume and pressure allows oxygen to be sucked into the lungs. Upon relaxation of the diaphragm and rib muscles, the lung tissue and the ribs relax. Consequently, the volume of the chest cavity decreases while its pressure increases and carbon dioxide is forced out of the lungs.

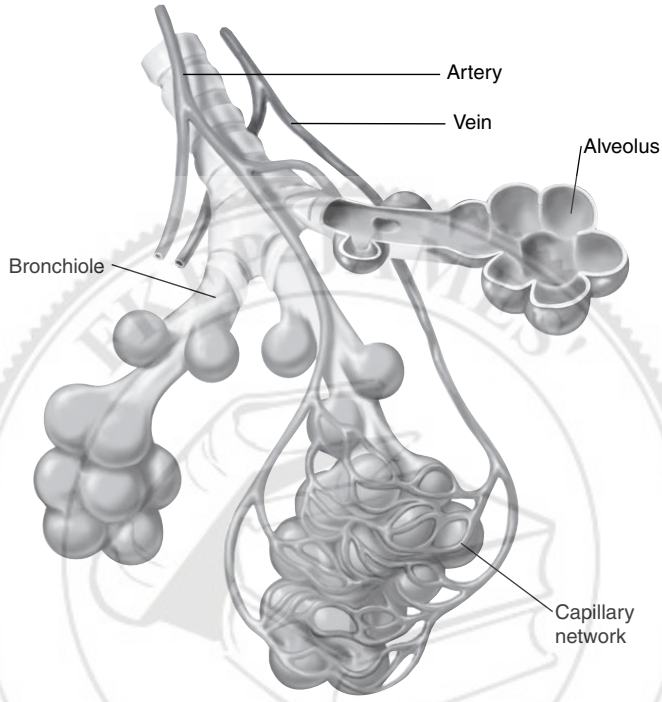
Respiratory function is measured in terms of both lung volumes and lung capacities. The names and definitions of these various measurements are presented in **Table 6-3** and **Figure 6-5**. This table and figure should be referred to throughout the following discussion of age-related changes in the respiratory system.

Aging of the Respiratory System

ALVEOLI

As a person ages, the alveoli of the lungs become flatter and shallower, and there is a decrease in the amount of tissue dividing individual alveoli. In addition, there is a decrease in the alveolar surface area. A person 30 years of age has an alveolar surface area of approximately 75 square

Figure 6-4(b) Alveolar structure.



Source: Robert E. Clark, *Anatomy and physiology: Understanding the human body.* Sudbury, MA: Jones and Bartlett Publishers, 2005.

meters. This surface area decreases by 4% per decade thereafter. Because gas exchange occurs over the surface of the alveoli, the age-related reduction in alveolar surface area impairs efficient passage of oxygen from the alveoli to the blood (De Martinis & Timiras, 2003).

Lung Elasticity

With age there is a decrease in the lungs' elasticity, which in turn causes a change in the elastic recoil properties of the lungs. During expiration, elastic recoil helps to keep the lungs open until all air is expelled and the lungs are forced to collapse due to the action of the respiratory muscles. Loss of elastic recoil causes the lungs to close prematurely, trapping air inside and preventing the lungs from emptying completely. As a result, unexpired air remains in the lungs and, consequently, during the next inhalation less air can be inspired (Krauss Whitbourne, 2002). Despite the reduced inspiratory capacity, **total lung capacity**—the maximum volume to which the lungs can expand during greatest inspiratory effort—remains virtually unchanged with age. After adjustment for age-related decreases in height, total lung capacity of both men and women decreases by less than 10% between the ages of 20 and 60 years (De Martinis & Timiras, 2003).

Table 6-3 RESPIRATORY VOLUMES AND CAPACITIES

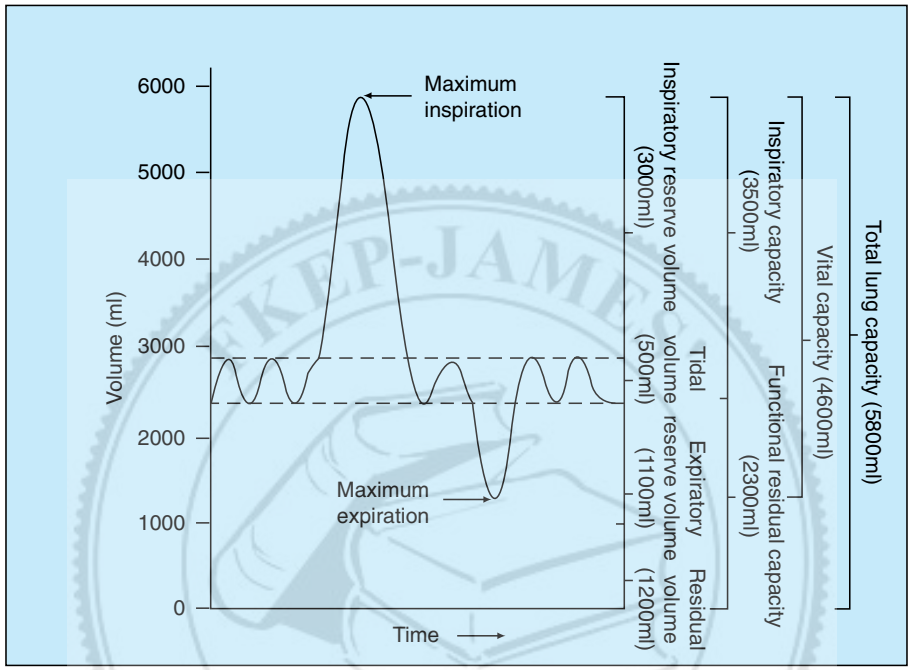
Volumes	Definition	Age-Related Changes
Tidal volume (TV)	Amount of air inspired and expired during a normal breath	Decrease
Inspiratory reserve volume (IRV)	Amount of air that can be inspired after maximum inspiration	Decrease
Expiratory reserve volume (ERV)	Amount of air that can be expired after maximum expiration	Decrease
Residual volume (RV)	Amount of air remaining in the lungs following maximum expiration	Increase
Forced expiratory volume (FEV)	Amount of air that can be forcefully expelled in one second	Decrease
Capacity	**Definition**	**Age-Related Changes**
Total lung capacity (TLC)	Maximum capacity to which the lungs can expand during maximum inspiratory effort	No change
Vital capacity (VC)	Amount of air that can be expelled following maximum inspiration	Decrease
Inspiratory capacity (IC) (IC = TV+ IRV)	Maximum amount of air that can be inspired after reaching the end of a normal expiration	Decrease
Functional residual capacity (FRC)	Amount of air remaining in the lungs following a normal expiration	Increase

Changes in lung elasticity can decrease the efficiency of oxygen delivery. Due to the effects of gravity, more blood flows through the lower than the upper portion of the lungs. However, because of the reduced ability of the aging lungs to expand during inhalation, less air reaches the lower portion of the lungs. Air is more likely to flow through the upper portion of the lungs. Yet, it is the lower lung that has a greater capillary network and blood supply for oxygen delivery. Thus, the decrease of air flow through the lower lung results in less efficient delivery of oxygen to the body. Consequently, as individuals age they must breathe in more air in order to achieve the same amount of gas exchange, a task that is difficult to accomplish with a loss of lung elasticity. This same upper–lower lung disparity is seen in young people. However, because of their greater lung elasticity, younger individuals are better able to compensate for the disparity by bringing more air into the lungs (Krauss Whitbourne, 2002).

THE CHEST WALL

The chest wall becomes stiffer with advancing age. The increase in stiffness is largely due to a loss of rib elasticity as well as age-related calcification of the cartilage that attaches the ribs to the breastbone. The stiffness of the chest reduces

Figure 6-5 Lung volumes and capacities.



Source: Reprinted from *Human physiology: Foundations & frontiers* (2nd ed.), D. Moffett, S. Moffett, & C. L. Schauff, pg. 458, 1993, with permission from Elsevier.

its ability to expand during inhalation and contract during exhalation. As a result, older persons often rely heavily on the diaphragm for expansion and contraction of the chest cavity when they breathe (Digiovanna, 1994). However, the diaphragm may weaken by up to 25% (Beers & Berkow, 2000) with age. This weakening, combined with an age-associated loss of overall muscle mass, reduces the contractual abilities of the diaphragm, limiting respiration.

Changes in Respiratory Measures

As a result of the age-related changes in lung tissue and the chest wall, the respiratory system of older adults is less able to provide sufficient gas exchange to meet the body's demand for oxygen, particularly at times of maximum physical exertion (Arking, 1998). This insufficiency is demonstrated by age-related changes in respiratory measures (Table 6-3).

Research has shown that **vital capacity**—the maximum amount of air that can be expelled following a maximum inspiration—decreases with advancing age. Between the ages of 20 and 70 years, vital capacity is reduced by approximately 40% (Krauss Whitbourne, 2002), and in some cases vital capacity in the seventh decade may decrease to almost 75% of its value at 17 years of age (De Martinis & Timiras, 2003). Residual volume, however, increases nearly 50%

with age (De Martinis & Timiras, 2003). This increase, in combination with reduced vital capacity, leads to a reduction in the amount of air that can be inspired. In addition, any fresh air that is inhaled is mixed with stale, residual air. This mixing, together with diminished inhalation, contributes to the lungs' reduced ability to deliver sufficient oxygen to the body (Krauss Whitbourne, 2002).

Residual volume is inversely related to **forced expiratory volume (FEV)**, the amount of air that can be forcefully expelled in 1 second. As residual volume increases, FEV decreases. Thus, evidence supporting a marked decrease in FEV with age is congruent with the age-related increase in residual volume (Arking, 1998).

Another respiratory measure known to change with age is the **ventilatory rate**, or the minute respiratory rate. Ventilatory rate is defined as the volume of air inspired in a normal breath (i.e., tidal volume) multiplied by the frequency of breaths per minute. At low levels of exertion, age does not appear to have any effect on ventilatory rate. However, at maximal exertion levels the ventilatory rate shows an age-related decline. Young adult males have a maximum capacity for inspiration of about 125 to 170 liters of air per minute, but this rate can be sustained for only approximately 15 seconds. A ventilatory rate of 100 to 120 liters of air per minute can be maintained for prolonged periods of time. However, by the age of 85 years, the ventilatory rate has decreased to approximately 75 liters per minute (Arking, 1998).

Age-Related Pathologies of the Respiratory System

The proportion of deaths due to respiratory disease is at its highest, approximately 30%, in the first year of life. By late adolescence and early adulthood only about 5% of deaths are attributed to respiratory disease. However, from the fifth decade of life on, there is a steady increase in the incidence of respiratory disease, and among persons over 85 years of age, respiratory disease accounts for 25% of all deaths (De Martinis & Timiras, 2003). Two of the most prevalent respiratory diseases among older adults are chronic obstructive pulmonary disease (COPD) and pneumonia.

Chronic Obstructive Pulmonary Disease (COPD)

COPD is characterized by limited airflow and impaired gas exchange. COPD encompasses chronic bronchitis, chronic obstructive bronchitis, and emphysema, or a combination of these disorders (Barnes, 2000). The pathology of COPD is characterized by a decreased ability of the lungs to respire properly. Environmental irritants such as cigarette smoke promote the production of excessive amounts of mucus within the airways. As this mucus builds up, the airways become restricted. The result is inefficient respiration in which excessive air accumulates in the alveoli, causing them to remain perpetually inflated. This constant inflation damages the alveolar walls, and the body repairs this damage by replacing the normally elastic tissue with fibrous tissues that are much less permeable to gas exchange. In addition, the fibrous tissue decreases elastic recoil, further contributing to inefficient and difficult respiration (Arking, 1998). Individuals with COPD often experience excessive cardiac workload as the heart tries to compensate for impaired airflow by pumping more blood to the lungs (Arking, 1998).

Pneumonia

Pneumonia is characterized by lung inflammation generally brought on by infection. The impaired immune response with age (see "The Immune System" later in this chapter) is thought

to play a significant role in the high prevalence of pneumonia seen among elderly persons. Older individuals are more susceptible to severe pneumonia and complications of pneumonia than are younger persons. In addition, mortality from pneumonia is known to be as high as 80% in those ages 60 years and older (Naughton, Mylotte, & Tayara, 2000).

The Gastrointestinal System

Aging in Key Components of the Gastrointestinal Tract

Overall, the gastrointestinal system (**Figure 6-6**) appears to be relatively preserved in aging with only minor changes. The two gastrointestinal areas most affected by age are the upper tract (the **pharynx** and **esophagus**) and the **colon**, also referred to as the large intestine (Hall, 2002). Changes in the gastrointestinal system can have multiple and varied effects, including effects upon consumption and absorption of nutrients and waste secretion. In this section, age-related changes of the gastrointestinal system, from the mouth to the large intestine and the accompanying glands and organs, will be evaluated.

The Mouth

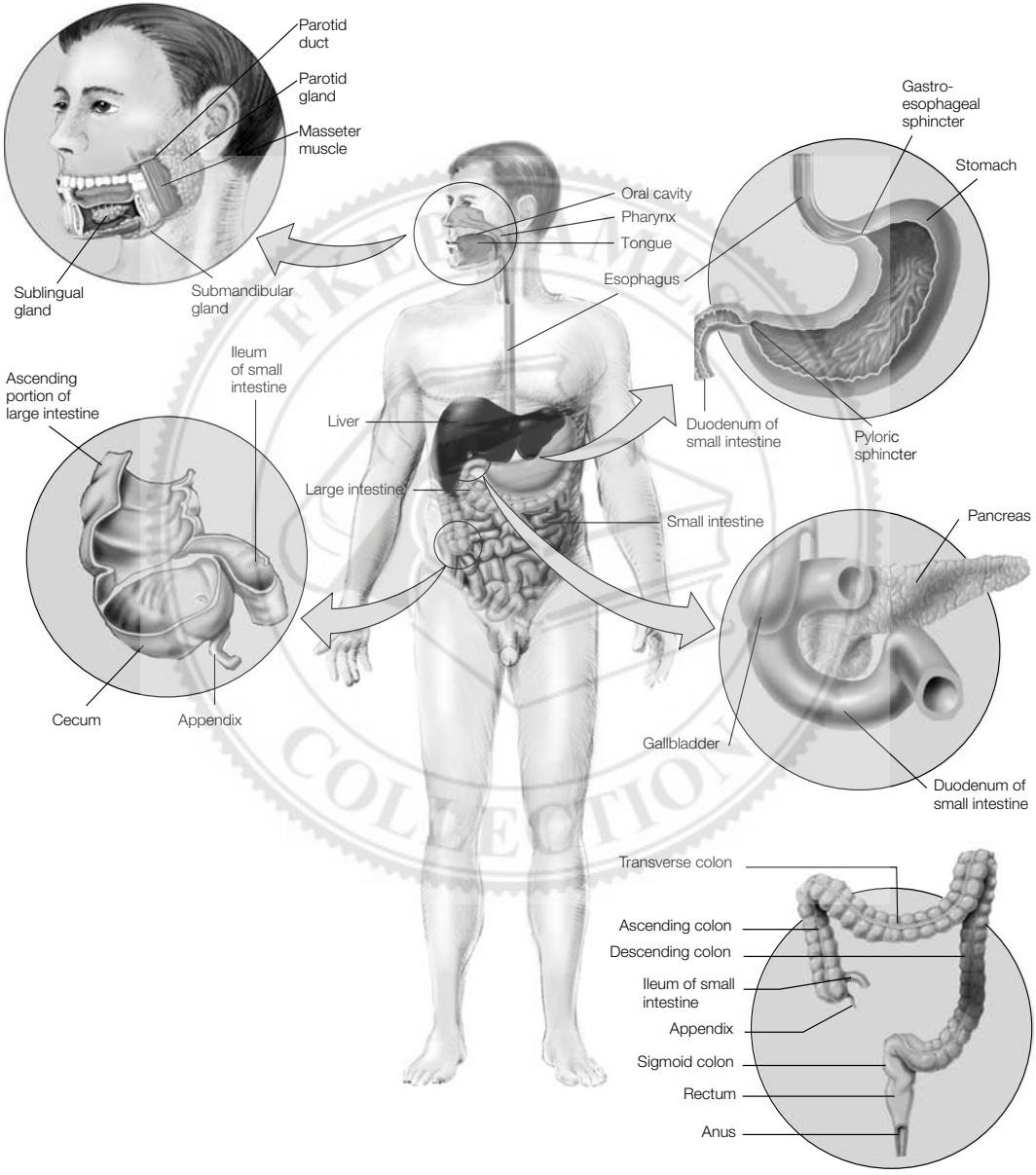
The gastrointestinal system begins at the mouth, which shows some signs of age-related changes that affect the ability to chew. Changes in taste also occur, as described in this chapter's "The Nervous System" section. The mouth is utilized for mastication, or chewing. It is responsible for moistening food with saliva. The chewing and moistening of food allows for easier passage of the processed content to the pharynx and esophagus (Arking, 1998; Hall & Wiley, 1999).

Dental decay and tooth loss affect many older individuals today, making it more difficult to chew and prepare food to be swallowed (Hall & Wiley, 1999). Age-related changes in teeth cause them to be less sensitive and more brittle (Devlin & Ferguson, 1998). However, in the near future tooth decay and loss may decline due to increased health awareness, improved dentistry practices, and higher availability of fluoride toothpaste and floss that were not available when today's generation of older adults was maturing.

With age, there is atrophy of those muscles and bones of the jaw and mouth that control mastication. Consequently, it is more difficult for older adults to chew their food (Devlin & Ferguson, 1998; Digiovanna, 2000; Karlsson, Persson, & Carlsson, 1991; Newton, Yemm, Abel, & Menhinick, 1993). Along with changes in the skeletal muscle, changes occur in the nerves that innervate the oral region. As a result, there is some change in the ability of the nerves and muscle to coordinate functioning (Digiovanna, 2000). Refer to "The Muscle" later in this chapter for additional information regarding aging changes in skeletal muscle.

Saliva produced and secreted by salivary glands and the oral mucosa assists in removing food from teeth, neutralizing acid, replacing minerals in enamel, inhibiting bacteria and fungi growth, and breaking down starch molecules (Devlin & Ferguson, 1998; Digiovanna, 2000). Salivary flow is controlled by the autonomic nervous system and is influenced by food touching the mouth, by jaw movement and by olfaction and gustation input (Bourdiol, Mioche, & Monier, 2004; Digiovanna, 2000). Although almost 40% of older adults complain of dry mouth, salivary gland function remains stable with age due to the large secretory reserve in the main salivary glands (Bourdiol et al., 2004; Devlin & Ferguson, 1998; Ghezzi & Ship, 2003; Tepper & Katz, 1998). Dry

Figure 6-6 The gastrointestinal system.



Source: Daniel D. Chiras, *Human Biology* (5th ed.). Sudbury, MA: Jones and Bartlett Publishers, 2005.

mouth can be attributed to prescription and over-the-counter medications, nutritional deficiencies, disease, and treatment therapies such as chemotherapy (Devlin & Ferguson, 1998; Ghezzi & Ship, 2003; Ship, Pillemer, & Baum, 2002).

The Esophagus

A study in 1964 showing impaired esophageal motility function in older individuals led to the development of the term *presbyesophagus*; however, the study included many individuals with diseases such as diabetes and neuropathy that confounded the findings (Soergel, Zboralske, & Ambers, 1964). Studies have since demonstrated preservation of esophageal functioning in aging until around age 80, when some changes occur. These changes include decline in upper esophageal sphincter pressure, increased time for the upper esophageal sphincter to relax, and decreased intensity of esophageal contractions potentially caused by loss of muscle abilities and nerve innervations (Fulp, Dalton, Castell, & Castell, 1990; Hall & Wiley, 1999; Orr & Chen, 2002; Schroeder & Richter, 1994). The lower esophageal sphincter was once thought to demonstrate age-related declines in contractions and impaired relaxation; however, recent work has shown that no real changes occur to the lower sphincter (Hall & Wiley, 1999).

Swallowing is controlled by the brain through cortical input to the medulla swallowing centers that have nerve endings in the skeletal muscle controlling the pharynx and esophagus (Hall & Wiley, 1999). The esophagus also contains smooth muscle that is controlled by nerve endings from the intestines and by the vagus nerve in the brain (Hall & Wiley, 1999). Rao and colleagues (2003) conducted a study evaluating sensory and mechanical changes in both skeletal and smooth muscle located in the esophagus and found that older adults demonstrated stiffening of the esophageal wall and less sensitivity to discomfort and pain in the esophagus. These changes affect the ability to swallow in the older patient. The gag reflex also appears to be absent in around 40% of healthy older adults (Davies, Kidd, Stone, & MacMahon, 1995). Dysphasia (difficulty swallowing), reflux, heartburn, and chest pain are common complaints that relate to changes in the pharynx and esophagus. Approximately 35% of older individuals report such complaints (Hall & Wiley, 1999; Orr & Chen, 2002; Reinus & Brandt, 1998; Shaker, Dua, & Koch, 1998).

The Stomach

Age-related declines in peristaltic contractions and stomach emptying do not appear to be clinically significant (Brogna, Ferrara, Bucceri, Lanteri, & Catalano, 1999; O'Mahony, O'Leary, & Quigley, 2002). A study by Madsen & Graff (2004) assessing gastrointestinal motility in aging concluded that no changes in gastric emptying occurred with age. Furthermore, enteric nerves or nerves innervating the intestinal system that control gastric motility do not change with age (Madsen & Graff, 2004). The only change that has been observed is slower gastric emptying in premenopausal women as compared to postmenopausal women and men. This premenopausal decline in gastric emptying is causally linked to increased progesterone levels during the menstrual cycle (Gryback et al., 2000; Petring & Flachs, 1990). Gastric acid secretions do not appear to change with age, but pepsin, bicarbonate, and sodium ion secretions and prostaglandin content do show age-related decline (Hall & Wiley, 1999). These secretion changes cause a decline in gastric defense mechanisms and create an increased potential for mucosal injury in the stomach (Hall & Wiley, 1999).

THE SMALL INTESTINE

Small intestine motility needed for digestion and absorption of nutrients has been reported to show no change or only minor changes in contraction intensity with age (Brogna et al., 1999; O'Mahony et al., 2002; Orr & Chen, 2002; Shaker et al., 1998). Madsen & Graff (2004) also discovered no age-related change in small intestine transit rate (the time needed for digested material to move through the length of the small intestine). This finding supports results from other studies. The endocrine and nervous system aid in motility functioning in the intestines, and any changes in these specific systems could potentially cause changes in intestinal abilities (Shaker et al., 1998). However, no clinically significant motility changes appear to occur in the small intestine with age.

Bacterial overgrowth related to the small intestine is a common clinical finding in the older population, causing malabsorption and malnutrition; however, these symptoms are not due to age changes, but are related to motility disturbance in the small intestine (Madsen & Graff, 2004; O'Mahony et al., 2002; Orr & Chen, 2002). Absorption of nutrients does not change with age. Changes in vitamin absorption are seen with particular vitamins but not others (Hall & Wiley, 1999). For instance, vitamin A absorption increases in older adults whereas vitamin D, zinc, and calcium absorption decreases. Absorption of vitamins B_1, B_{12}, C, and iron does not change with age (Baik & Russell, 1999; Hall & Wiley, 1999; Simon, Leboff, Wright, & Glowacki, 2002; Tepper & Katz, 1998).

THE LARGE INTESTINE

The large intestine, also referred to as the colon, measures approximately 5 feet long when stretched out and covers the area from the small intestine to the anus (Digiovanna, 2000). In aging, a loss of enteric, or intestinal, neurons and a loss of inhibitory nerve connection to the smooth muscle in the colon occur. These losses cause changes in motility via a decreased ability to inhibit colonic contractions and/or by decreased colonic relaxation (Shaker et al., 1998). Madsen & Graff (2004) concluded that older adults experience longer colonic transit time (the amount of time needed for fluid and excrement to travel the length of the colon). This change again relates to age-related loss of neurons and receptors in the enteric nervous system. Increased colonic transit time also correlates with increased fibrosis in the colon (Hall, 2002). Colonic pressure in the intralumen also increases with age, but can be lowered with fiber supplementation (Hall, 2002).

The rectum, a colonic structure that is located before the anus, shows an age-related increase in fibrous tissue. This increase reduces the rectum's ability to stretch as feces pass through (Digiovanna, 2000). In the anus, the external anal sphincter shows an age-related decrease in motor neurons responsible for sphincter control. This sphincter also thins with age. However, the internal anal sphincter thickens with age, possibly as a compensatory mechanism. Nonetheless, it shows a decline in contractile abilities (Digiovanna, 2000; Nielson & Pedersen, 1996; O'Mahony et al., 2002; Rociu, Stoker, Eijkemans, & Lameris, 2000). Aging women experience a greater risk of anal sphincter changes due to laxity of the pelvic floor, decreased pressure in the rectum, and even menopause (Hall, 2002).

Aging in Accessory Glands and Organs

As people age relatively no changes occur in the secretions of the liver, pancreas, and gallbladder

(Hall, 2002). However, these accessory glands and organs, which work in close association with the gastrointestinal system, remain crucial for intestinal stability.

The Liver

The **liver** is the largest gland in the body and contributes to the conversion of food by secreting bile into the small intestine and by screening blood from the stomach and small intestine for toxic substances, excess nutrients, and ammonia (Digiovanna, 2000). With age, the liver's size as well as its blood flow and perfusion can decrease by 30% to 40%. In addition, hepatocytes, or liver cells, can undergo structural alterations. However, due to the liver's large reserve capacity and the hepatocytes' ability to regenerate after damage, no functional changes result from the changes in structure (Digiovanna, 2000; Hall & Wiley, 1999; James, 1998; Marchesini et al., 1988; Schmucker, 1998; Wynne et al., 1989). Decreased drug clearance in the older population can occur due to the observed declines in liver size and blood flow as well as age-related changes in the kidneys, but this is highly variable among individuals (James, 1998; Le Couteur & McLean, 1998; McLean & Le Couteur, 2004).

The Gallbladder

The **gallbladder** is a small sac located below the liver that stores the bile sent from the liver. Bile is stored until the gallbladder receives intestinal and pancreatic signaling via the hormone cholecystokinin. This signaling indicates a readiness for digestion and, in response, bile is released into the ducts of the small intestine (Digiovanna, 2000; MacIntosh et al., 2001). Refer to Figure 6-6 for the location and anatomical structure of the gallbladder. With age, no overall structural changes occur in the gallbladder with the exception of the bile ducts (Digiovanna, 2000). However, in older adults the gallbladder appears to demonstrate declines in emptying rates so that less bile is secreted when food is digested (Hall & Wiley, 1999). Increased bile volume in the gallbladder has been correlated with gallstones in older adults. This increase in bile volume is more common in older women than men (Bates, Harrison, Lowe, Lawson, & Padley, 1992; Hall & Wiley, 1999). The bile ducts tend to widen with age, allowing potential gallstones to pass through more easily; however, the duct near the opening of the small intestine becomes narrower, trapping the gallstones and leading to abnormal changes (Digiovanna, 2000).

The Pancreas

The **pancreas** is a gland located below the stomach and above the small intestine. Refer to Figure 6-6 for pancreatic location and structure. The pancreas secretes pancreatic fluid that neutralizes stomach acid and accelerates the transport of large nutrients into ducts that eventually converge with the bile duct leading into the small intestine (Digiovanna, 2000; Hall & Wiley, 1999). The pancreas decreases in weight with age and shows some histological changes such as fibrosis and cell atrophy (Hall & Wiley, 1999). However, due to the large reserve capacity of the pancreas, the small changes that occur, including changes in the enzymes that aid in stomach acid neutralization and nutrient breakdown, do not affect overall pancreatic function as a person ages (Digiovanna, 2000; Hall & Wiley, 1999).

Gastrointestinal Immunity

The gastrointestinal tract, with a mucosal lining containing immunological properties, is the largest organ (Hall & Wiley, 1999). The immune

response in the gastrointestinal system depends on the congruent work of lymphoid and epithelial cells (Schmucker, Thoreux, & Owen, 2001). Secretion of antibodies into the intestinal mucosa works to neutralize toxins, block bacteria from adhering to surfaces, and block antigens from crossing the mucosa (Holt, 1992; Schmucker et al., 2001). Research has suggested a decline in immunological function in the aging gastrointestinal system. This decline can increase rates of infections that occur via the gastrointestinal system. Infection may, in turn, lead to mortality and morbidity (Arranz, O'Mahony, Barton, & Ferguson, 1992; Schmucker, Heyworth, Owen, & Daniels, 1996; Schmucker et al., 2001; Schmucker, Owen, Outenreath, & Thoreux, 2003). A decline in **gastrointestinal immunity** can be attributed to a change in lymphoid cells or epithelial cells, or possibly both cell types (Schmucker et al., 2001).

Although relatively few changes occur in the aging gastrointestinal system, changes that do occur increase the risk for diseases and disorders. Age-related changes, compounded by other influential factors such as comorbidity and medication use, place older individuals at increased risk for gallstones, constipation, fecal incontinence, and infection.

The Genitourinary System

Overview of the Genitourinary System

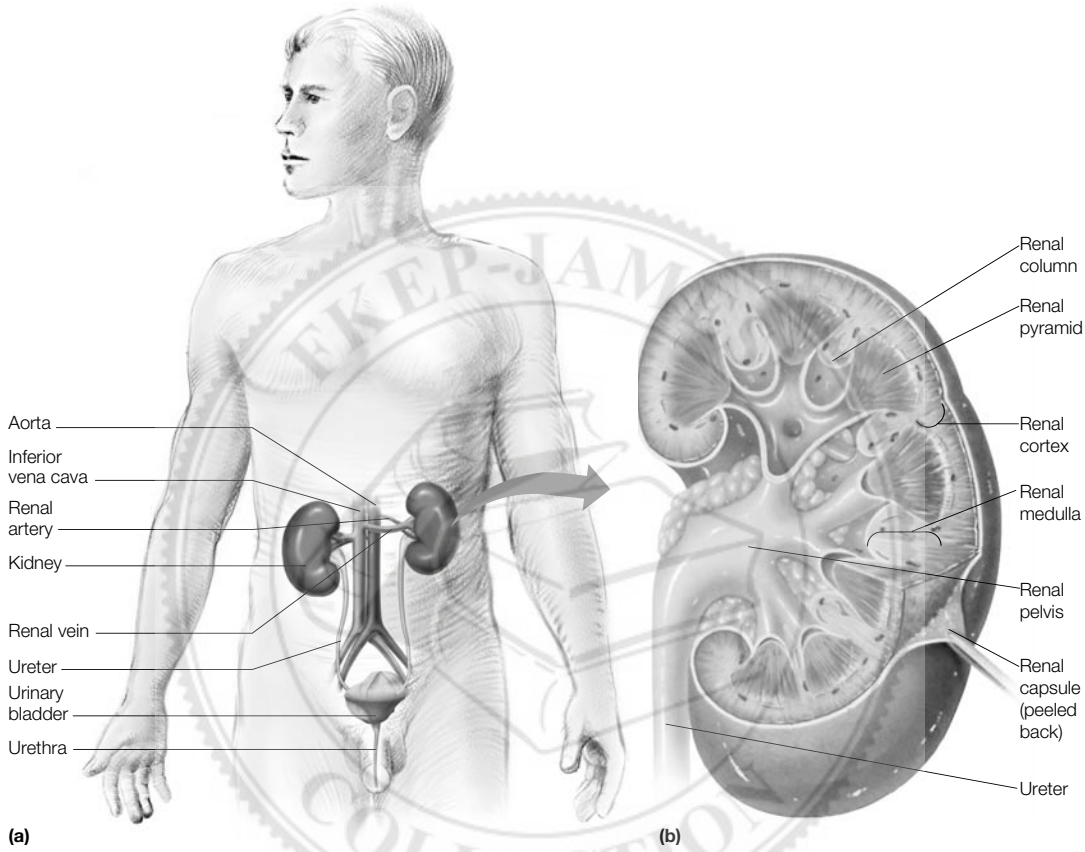
The genitourinary system (**Figure 6-7**) in both males and females contains the kidneys and associated renal arteries and veins, the **ureters**, the bladder, and the **urethra** running through the genitalia (Digiovanna, 2000; Lindeman, 1995). The urinary system provides many functions that help the body to maintain **homeostasis**, or balance of the organ systems. For instance, the urinary system: 1) removes wastes and toxins such as ammonia, uric acid, and some medications from the blood, 2) regulates osmotic pressure in the blood and interstitial fluid, 3) regulates concentration levels of calcium, sodium, potassium, magnesium, and phosphorus, 4) controls acid/base balance by making necessary adjustments, 5) regulates blood pressure, 6) activates vitamin D in order to maintain calcium levels, and 7) regulates oxygen level through stimulation of erythropoietin, the hormone responsible for increased red blood cell production in the bone marrow (Digiovanna, 2000; Lye, 1998). The kidneys form urine through a process of filtration, reabsorption, and secretion with constant homeostasis maintained throughout the process (Digiovanna, 2000). Under usual living conditions the kidneys can be maintained on as little as 30% capacity, but under stressful conditions such as high temperatures kidney reserves are needed to maintain proper functioning (Digiovanna, 2000). For age-related changes in genitalia, refer to the section "The Reproductive System." In this section, aging structural and functional changes in the urinary system will be evaluated.

Urinary Structural Changes with Age

The Kidneys

With age, the kidneys shrink in length and weight. At 30 years of age, the average kidney weighs 150 to 200 g. By age 90, weight has declined to between 110 and 150 g (Beck, 1998, 1999a; Jassal, Fillit, & Oreopoulos, 1998; Lindeman, 1995; Minaker, 2004). The number of **glomeruli** decreases by as much as 30% to

Figure 6-7 The genitourinary system.



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40% by age 90 due to glomerulosclerosis. Remaining glomeruli decrease in size but increase in basement membrane thickness (Beck, 1999a; Lindeman, 1995; Musso, Ghezzi, & Ferraris, 2004). The size and number of **nephrons**, the combination of the Bowman's capsule and renal tubule with the glomerulus, also decrease with age (Jassal & Oreopoulos, 1998; Jassal et al., 1998; Minaker, 2004). On average, renal blood flow declines 10% per decade beginning as early as 20 years of age. Young adults (20 years) average a renal blood flow of 600 ml/min whereas average blood flow in older adults (80 years) averages only 300 ml/min (Beck, 1999a; Digiovanna, 2000; Jassal et al., 1998; Lindeman, 1995; Minaker, 2004). Furthermore, blood flow declines with age due to changes in the arteries and capillaries in the kidneys (Digiovanna, 2000; Jassal et al., 1998; McLean & Le Couteur, 2004). Renal blood flow in the cortical section of the kidneys declines at a much quicker rate compared to the average

renal blood flow rate. This indicates that cortical nephrons are severely affected by age (Lindeman, 1995). Changes in blood flow and **glomerular filtration rate** (GFR) account for a majority of functional disability in the kidneys with age. With disease and some medications, blood flow and GFR can be further compromised (Beck, 1999a; Digiovanna, 2000; Lindeman, 1995). The GFR variably declines with age. This decline is measured by creatinine or insulin clearance and usually begins in the third decade as a result of changes in glomeruli, clustering of capillaries, and renal blood flow rate (Digiovanna, 2000; Jassal et al., 1998; McLean & Le Couteur, 2004; Rowe, Andres, Tobin, Norris, & Shock, 1976). A decline in GFR becomes significant as people age because elimination of waste and toxins declines, causing an accumulation of harmful substances such as uric acid and medications in the body (Digiovanna, 2000; McLean & Le Couteur, 2004). Renal tubules also show age-related changes, including decreased number and length. There is also evidence of age-related interstitial fibrosis and thickening of renal tubule basement membranes. This can affect reabsorption and excretion (Beck, 1999a; Jassal & Oreopoulos, 1998; Jassal et al., 1998). Although age-related structural changes in the kidneys are observed, the kidneys contain a large reserve capacity, and functional abilities remain relatively stable unless stressed (Beck, 1999a; Jassal et al., 1998; Minaker, 2004).

The Bladder

The bladder is a hollow organ lined with a mucous membrane, contains smooth muscle including the **detrusor** muscle, and consists of two components, the bladder body and the base (Andersson & Arner, 2004; Kevorkian, 2004). With age, the bladder decreases in size and develops fibrous matter in the bladder wall, changing overall stretching capacity and contractibility (Digiovanna, 2000). The filling capacity of the bladder also declines along with the ability to withhold voiding (Diokno, Brown, Brock, Herzog, & Normolle, 1988; Elbadawi, Diokno, & Millard, 1998; Resnick, Elbadawi, & Yalla, 1995). The ability of the detrusor to contract declines in both aging men and women, and there is an increase in incidence of detrusor overactivation (Diokno et al., 1988; Minaker, 2004; Resnick et al., 1995). However, other research has not shown any age-related changes in detrusor contractility, but has demonstrated that the detrusor in usual aging remains stable with unchanged contractility and no observable obstructions (Elbadawi, Yalla, & Resnick, 1993; Madersbacher et al., 1998). In around 50% of men with benign prostatic hyperplasia (BPH), the enlargement of the prostate causes obstruction of the bladder outlet and results in urinary dysfunction (Resnick et al., 1995). In response to bladder outlet obstruction, the bladder walls become thicker and stronger in order to recompense for declining function (Elbadawi et al., 1998). Overall, the bladder goes through few variable structural changes with age, but these changes can impact a person physically.

Ureters and the Urethra

The urinary system contains two ureters that connect each kidney to the bladder, but ureters do not demonstrate any age-specific changes (Digiovanna, 2000).

The urethra forms the canal that leads from the bladder out of the body and also functions in response to excitatory or inhibitory stimuli (Andersson & Arner, 2004; Brading, Teramoto, Dass, & McCoy, 2001; Digiovanna, 2000). In the male, the sphincter elevates from the prostate encompassing the urethra (Strasser et al., 1996).

In the female, the urethra extends about 3 to 4 cm. Males have longer urethras; this is due to the urethra's anatomical location in the penis (Digiovanna, 2000; Kevorkian, 2004). With age, the length of the urethra and the pressure needed to close off the urethra both decline in women (Elbadawi et al., 1998; Madersbacher et al., 1998; Resnick et al., 1995). Also, the urethra thins with age and striated muscle that controls sphincters also thins and weakens (Digiovanna, 2000; Kevorkian, 2004). In men, the prostate gland surrounds the urethra directly below the bladder (see Figure 6-7) and prostate enlargement around the bladder and urethra can cause urinary dysfunction (Digiovanna, 2000; Hollander & Diokno, 1998; Resnick et al., 1995).

Urinary Functional Changes with Age

Urination

Urination involves both the central and peripheral nervous systems and requires that bladder contraction and urethral relaxation occur simultaneously (Andersson & Arner, 2004; Kevorkian, 2004). The amount of urine expelled from the body decreases with age correlating with increases of around 50–100 ml in postvoid residual (PVR) with age (Madersbacher et al., 1998; Minaker, 2004). Renal changes affect the ability to concentrate and dilute the urine, causing electrolyte imbalance (Jassal & Oreopoulos, 1998; Muhlberg & Platt, 1999). Urine osmolality in the older adult only reaches about half of that in a younger adult, leading to increased water loss in the aged (Beck, 1999). Older individuals also experience an increase in **nocturia** or an increased number of fluid voids occurring at night, which can disturb sleep patterns (Kirkland et al., 1983; Lubran, 1995; Muhlberg & Platt, 1999; Asplund, 2004).

Prostate volume increases in aging males, and it is possible that, with longevity, every male will experience benign prostatic hyperplasia (BPH) (Madersbacher et al., 1998). BPH can lead to prostatic changes that influence lower urinary tract function as well as erectile and ejaculatory disorders (Hafez & Hafez, 2004; Hollander & Diokno, 1998; Paick, Meehan, Lee, Penson, & Wessells, 2005; Rosen et al., 2003). More specifically, in BPH the prostate enlarges enough to encroach on the urethra and bladder causing urinary retention, difficulty voiding, urinary tract infections, and, in advanced stages, renal failure (Resnick et al., 1995; Hollander & Diokno, 1998). Nerve stimulations to the smooth muscle of the prostate, bladder, and urethra occur in BPH, causing voiding difficulty. However, blocking the stimulus allows the muscle to relax, improving voiding abilities in BPH (Hollander & Diokno, 1998).

Glomerular Filtration Rate

The glomerular filtration rate (GFR), usually measured by creatinine clearance, declines in older individuals, but there is no resultant increase in blood creatinine concentration (Beck, 1999; Minaker, 2004). Creatinine clearance is measured by the Cockcroft-Gault equation (1976):

$$\frac{140 - \text{age (years)} \times \text{weight (kg)}}{72 \times \text{serum creatinine (mg/dl)}}$$

*Note: Multiply by 0.85 for females.

Measuring creatinine does not yield an accurate concentration rate because 1) the creatinine production rate is variable, 2) the tubules also secrete creatinine, and 3) elders have decreased muscle mass. Inaccuracy in measurement generally results in an overestimation of creatinine level of about 20% to 30% (Fliser et al., 1997; Lindeman, 1995; McLean & Le Couteur, 2004). The Cockcroft-Gault equation can be used to predict renal disease

but may not reflect the usual aging process. As a result, use of the equation can lead to medication underdosing in healthy older adults and overdosing in compromised older adults (Fliser et al., 1997; Lubran, 1995; McLean & Le Couteur, 2004; Rule et al., 2004). A closer estimation of actual GFR comes from inulin clearance or non-radio-labeled iothalamate (Lubran, 1995; Muhlberg & Platt, 1999; Rule et al., 2004).

Adverse drug reactions occur approximately 3 to 10 times more often in the older population as compared to younger cohorts (Muhlberg & Platt, 1999). Adverse drug reactions in the older population occur as a result of changes in the kidneys, more specifically changes in GFR and renal clearance. Adverse drug reactions can also occur due to changes in tubular filtration (Abernathy, 1999; Muhlberg & Platt, 1999). Estimates of GFR among older adults correlate with aging tubular filtration and are often used to determine the amount of drug to use in the older population (Lindeman, 1990). The key phrase in geriatric pharmacy remains "start low and go slow" because of renal changes that affect pharmacokinetics and pharmacodynamics with age (Abernathy, 1999; Muhlberg & Platt, 1999). Furthermore, polypharmacy and medication compliance are also associated with increased adverse events in the older population (Abernathy, 1999).

Homeostasis Changes

Overall, the aging kidneys function relatively well in maintaining fluid levels and electrolyte concentration balance; however, age-related changes are more readily observed under conditions of stress such as dehydration and high temperatures (Arking, 1998; Minaker, 2004). Age-related structural changes in the kidneys lead to some functional declines such as deterioration in the ability to regulate sodium concentrations under usual conditions. In addition, there is a decline in the ability to maintain sodium and potassium **homeostasis** and to conserve water during times of stress (e.g., dehydration) (Jassal & Oreopoulos, 1998; Minaker, 2004). The inability to properly regulate sodium can be attributed to malfunctioning of the ascending Loop of Henle in addition to increases in prostaglandin levels and tubular unresponsiveness to aldosterone (Musso et al., 2004). A decline in overall potassium level in the body also occurs with age due to low potassium secretion resulting from the decline in tubular reaction to aldosterone (Jassal & Oreopoulos, 1998; Muhlberg & Platt, 1999; Musso et al., 2004). Older adults also experience changes in the ability to reabsorb water and, in conjunction with decreased thirst in older adults, the body can become dehydrated more quickly (Lye, 1998; Musso et al., 2004). Acid–base homeostasis appears to be relatively stable (pH 6.9 to 7.7) in older adults under usual conditions; however, under conditions of acid overload older adults cannot excrete acid as quickly as younger adults (Lindeman, 1998; Muhlberg & Platt, 1999; Sorribas et al., 1995). The nephron functionally serves the kidneys by balancing sodium and water and eliminating waste from the bloodstream (Arking, 1998). With age, nephrons shrink in size and decrease in number. This is partly due to decreased blood flow in the glomeruli, which causes an increase in solute levels and eventually renders the nephron nonfunctional (Arking, 1998; Jassal et al., 1998; Minaker, 2004). Changes in homeostasis can negatively impact both the structural and functional capacity of the renal system.

Hormone Changes

Plasma renin and aldosterone concentration levels gradually decline with age, beginning around 40 years of age (Muhlberg & Platt, 1999). With age, the renin-angiotensin system undergoes a decline in its ability to maintain salt levels fol-

lowing salt deprivation (Corman et al., 1995; Mimran, Ribstein, & Jover, 1992). In addition, the renin-angiotensin-aldosterone axis fails to adequately respond to hormone volume changes in healthy older adults without deprivation; therefore, maximum sodium levels cannot be attained (Beck, 1999; Muhlberg & Platt, 1999). During normal renal functioning, antidiuretic hormone controls the diluting and concentrating of urine, ensuring that maximum levels of dilution and concentration are attained (Muhlberg & Platt, 1999). Antidiuretic hormone release increases in older adults in reaction to declining hormone volumes. This correlates with the increased sensitivity of osmoreceptors and decreased renal response (Jassal & Oreopoulos, 1998). Aging changes also occur in the calcium-parathormone-vitamin D_3 axis, as exhibited by decreased serum calcium levels, increased parathyroid hormone levels resulting from GFR decline, and declines in vitamin D metabolism by the aging kidneys (Chapuy, Durr, & Chapuy, 1983; Marcus, Masdirg, & Young, 1984; Massry et al., 1991; Muhlberg & Platt, 1999; Vieth, Ladak, & Walfish, 2003). Due to the decline in vitamin D metabolism by the kidneys, vitamin D supplementation is usually recommended in the older population (Vieth et al., 2003).

Age-related changes in the genitourinary system lead to alterations in genital structures, voiding behaviors, toxin and medication clearance, hormone levels, and overall physiological homeostasis of the body. Overall structural and functional changes can be variable with age, but these changes can impact a person physically, emotionally, psychologically, and socially, especially when urinary function declines and becomes abnormal, as seen with incontinence. Although aging changes in the kidneys can be variable among older adults, as seen with GFR, as a whole these changes are quite common and should be considered when evaluating and treating an older population.

The Reproductive System

Female changes in the reproductive system are most notably associated with the onset of **menopause** and subsequent declines in estrogen. Menopause and symptoms associated with menopause serve as the physical reminder of reproductive aging, but underlying neuroendocrine and ovarian changes occur years earlier. Male changes in the reproductive system are mostly associated with androgen deficiency and physical syndromes such as impotency. However, changes in reproductive hormones affect not only the reproductive system, but also other physiological systems. This section will provide an overview of all of the changes associated with reproductive aging in both women and men. The reader should refer to **Figures 6-8** and **6-9** for an illustration of the female and male reproductive systems.

Female Reproductive Aging

Neuroendocrine Function

The **reproductive axis** refers to the integration of the hypothalamus, pituitary, and gonads (ovaries for women). The axis controls reproductive hormones and ovulatory cycles (Chakraborty & Gore, 2004; Hall, 2004). The hypothalamus releases **gonadotropin-releasing hormone (GnRH)**, which binds to corresponding gonadotrope receptors in the pituitary, stimulating the synthesis and release of **follicle-stimulating hormone (FSH)** and **luteinizing hormone (LH)** (Hall, 2004). FSH regulates ovarian follicle development and the conversion of androstenedione to estrogen. LH regulates

Figure 6-8 The female reproductive system.

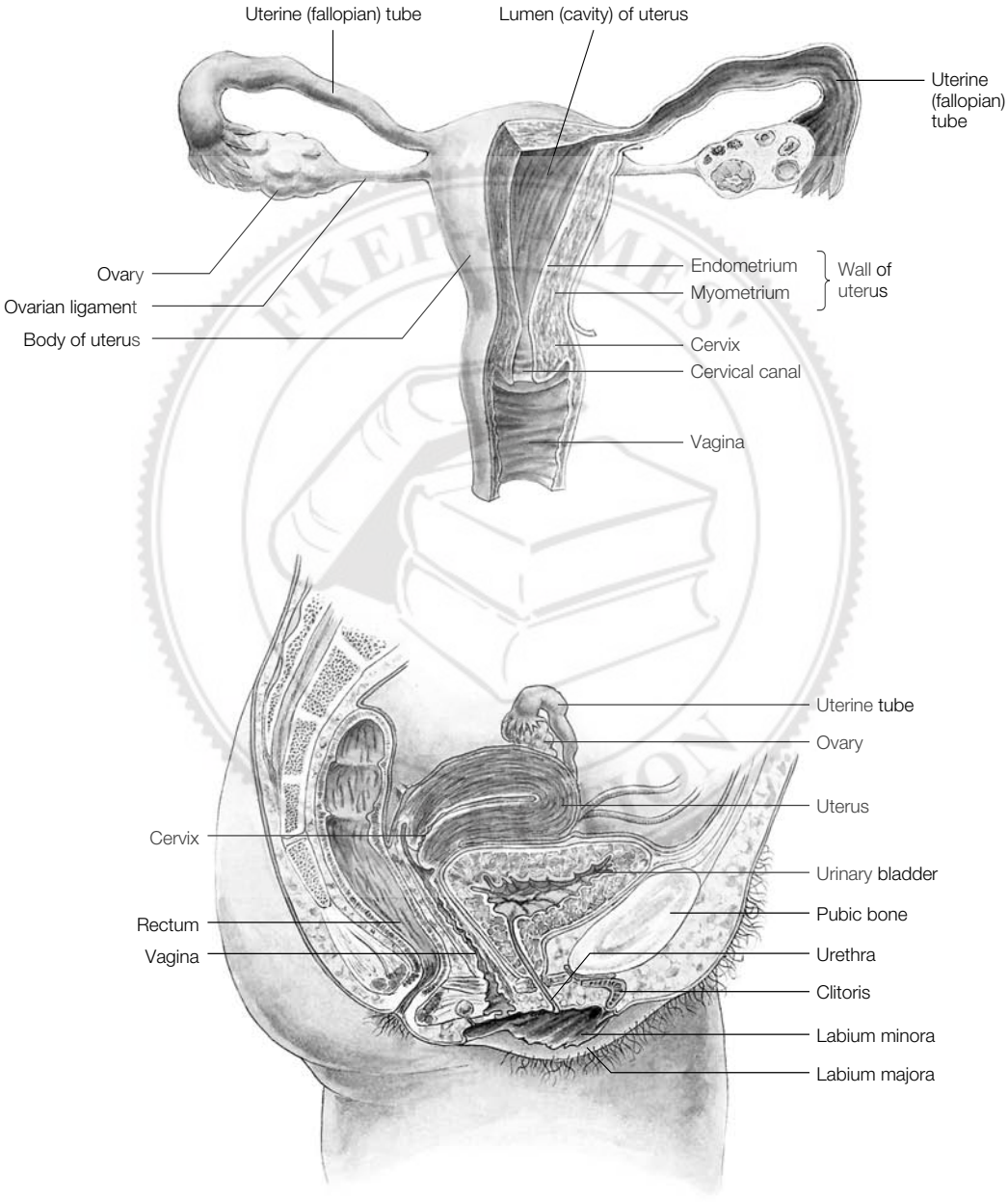

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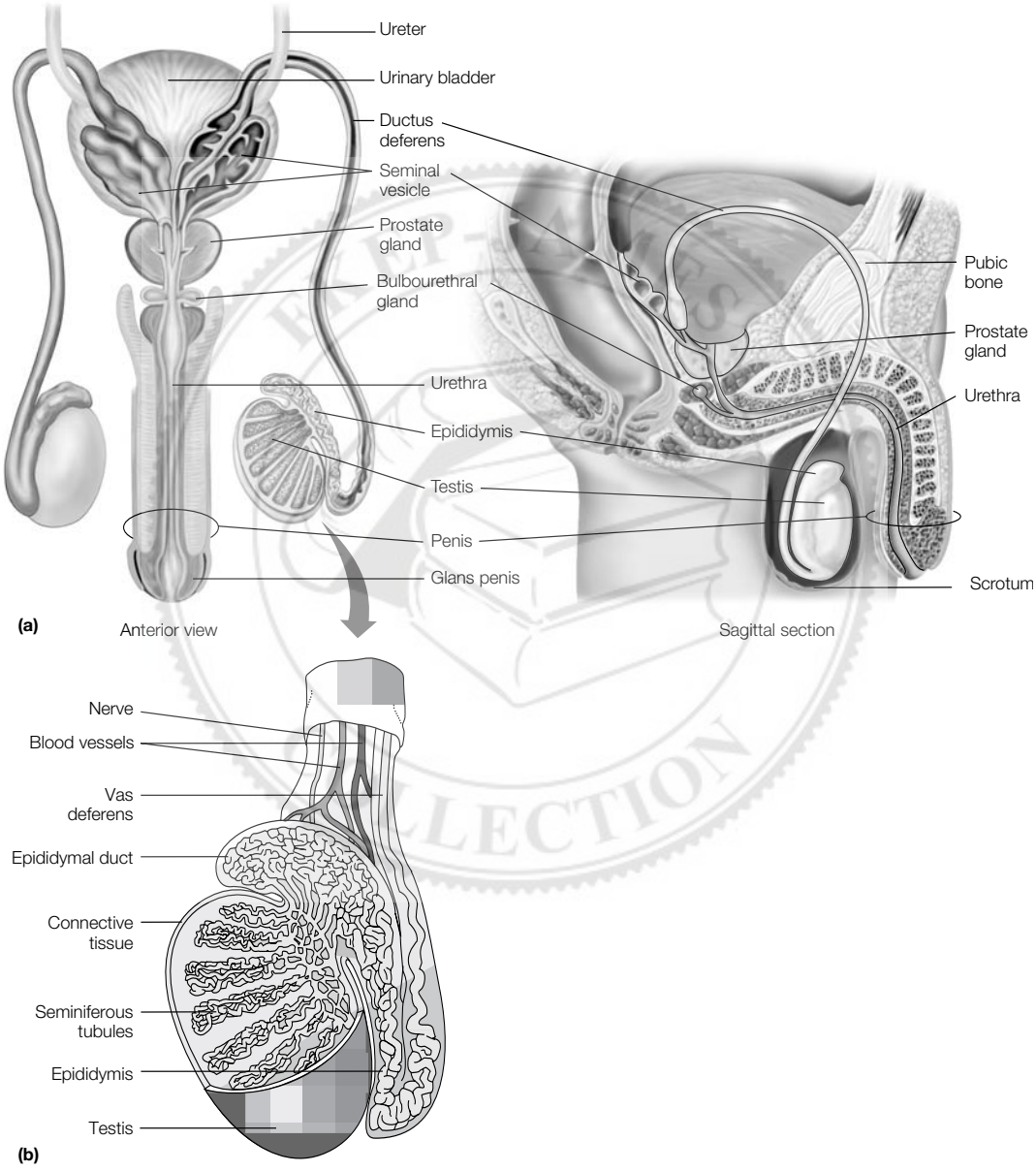
Figure 6-9 The male reproductive system.



Source: Daniel D. Chiras, *Human biology* (5th ed.). Sudbury, MA: Jones and Bartlett Publishers, 2005.

ovulation, supports the corpus luteum, and helps synthesize androgens (Hall, 2004; Yialamas & Hayes, 2003). Reproductive function relies heavily on hormone signaling from the ovaries to the hypothalamus and pituitary as demonstrated by FSH secretion in the development of mature oocytes (Hall, 2004). The menstrual cycle functions on a negative feedback system, but also relies on positive feedback with estrogen in order to produce the LH surge for ovulation (Hall, 2004). **Figure** 6-10 demonstrates the menstruation cycle along with corresponding changes in ovarian hormone levels throughout the cycle.

Age-related changes in neuroendocrine function include a change in gonadotropin levels. This change occurs before ovarian age-related changes, implicating involvement of the hypothalamus. With age, FSH levels begin increasing before menopause occurs and continue to increase throughout and after menopause. Estradiol levels tend to increase right before and while transitioning into menopause and then drastically decrease during menopause (Joffe, Soares, & Cohen, 2003). **Inhibin B**, a glycoprotein that usually suppresses FSH, also decreases in older women, explaining the observed increase in FSH (Hansen et al., 2005; Klein et al., 1996; Santoro, Adel, & Skurnick, 1999). Age-related changes in circulating hormones, estrogen and progesterone, strongly affect hypothalamic and pituitary responses to positive and negative hormone feedback systems. Finally, age-related changes occur in estrogen and progestin receptors located in the brain. These changes occur independently of changes in circulating hormone levels in the body (Chakraborty & Gore, 2004; Gill, Sharpless, Rado, & Hall, 2002; Hall, Lavoie, Marsh, & Martin, 2000; Rossmanith, Handke-Vesel, Wirth, & Scherbaum, 1994).

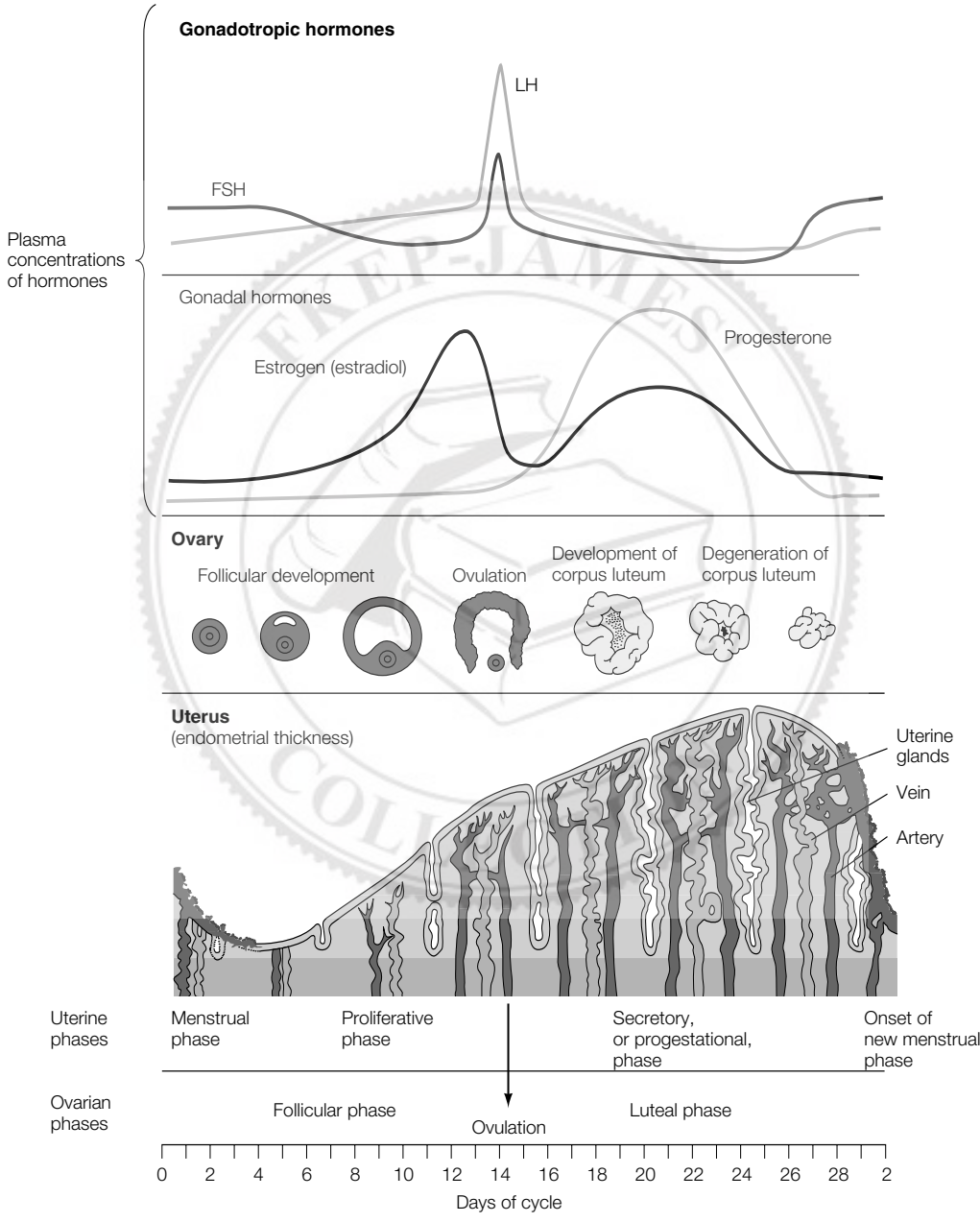
Age-related decline in estrogen affects the brain, resulting in some cognitive changes, insomnia, or even depression. Estrogen decline also affects other areas of the body that contain estrogen receptors and estrogen–dependent tissue (Wise, Krajnak, & Kashon, 1996; Smith, 1998; Wise, Dubal, Wilson, Rau, & Bottner, 2001). For example, with decreased estrogen levels the skin contains less collagen and becomes thin, sweat and sebaceous glands become dry, hair follicles begin to dry, bones lose calcium and undergo increased bone resorption, breasts lose connective tissue but gain adipose tissue, lipoproteins increase, bladder function decreases, cardiovascular function and blood pressure change, and the absorption and metabolism of nutrients become less efficient (Smith, 1998; Wise et al., 1996). A majority of the emphasis concerning estrogen has been on neuroprotective effects, including delay of onset in Alzheimer's disease and Parkinson's disease as well as protection against nerve cell death and brain injury (Roof & Hall, 2000; Wise, Dubal, Wilson, Rau, & Bottner, 2001; Wise, Dubal, Wilson, Rau, & Liu, 2001).

Female System Changes

The Ovaries. With age, the ovaries atrophy to such a small size that they can become impalpable during an exam (Smith, 1998). The number of ovarian follicles decreases with age leading to a decline in fertility. This decline usually begins in the 30s or 40s and more rapid declines occur after age 35 (Digiovanna, 2000; Hall, 2004; Smith, 1998). The ovarian follicles that remain through these declining years tend to be underdeveloped and only a few follicles ovulate and form a corpus luteum. Eventually, by the age of 50 to 65 years, a woman will have no remaining viable follicles (Digiovanna, 2000; Smith, 1998; Wise et al., 1996).

In the late reproductive years, around age 45, when fertility declines, FSH levels tend to increase earlier in the follicular phase than they do among younger woman. The earlier decline in FSH

Figure 6-10 The menstrual cycle.



Source: Daniel D. Chiras, *Human biology* (5th ed.). Sudbury, MA: Jones and Bartlett Publishers, 2005.

occurs even before increases in levels of LH or decreases in levels of estradiol (Hall, 2004; Wise et al., 1996). The increase in FSH levels is attributed to the drastic age-related decline in inhibin B, a glycoprotein synthesized in the ovaries that suppresses FSH secretion in younger individuals (Hall, 2004; Wise et al., 1996). This decline in inhibin B along with an increase in FSH establishes the earliest age-related changes in the ovaries (Hall, 2004). In the clinical setting, FSH values are determined at day 3 of the menstrual cycle in order to indicate the stage of reproductive age (Hall, 2004). Reproductive aging causes a decline in estrogen due to a decrease in ovarian follicles. A decline also occurs in progesterone (Chakraborty & Gore, 2004; Smith, 1998). The ovaries also produce about 25% of the testosterone in women. The rest is supplied by the adrenal glands and conversion of androstenedione, a testosterone precursor (Horton & Tait, 1966; Yialamas & Hayes, 2003). However, testosterone in women is only about one-tenth of that found in men (Judd & Yen, 1973; Yialamas & Hayes, 2003). These changes in the ovaries, including ovarian failure and oocyte depletion, are causally linked to the triggering of menopause (Hall, 2004; Wise et al., 1996).

The Uterus. Age-related decreases in uterine endometrial thickening during menstrual cycles occur as the result of decreased estrogen and progesterone levels (Digiovanna, 2000). This thickening leads to a decline in menstrual flow, eventually causing missed menstrual cycles and permanent cessation of ovulation and menstruation (Digiovanna, 2000). The supporting ligaments attached to the uterus are weakened with age, causing the uterus to tilt backward (Digiovanna, 2000). Over the postmenopausal period the uterus decreases in size by as much as 50% and may become so small as to be impalpable in women over the age of 75 (Digiovanna, 2000; Smith, 1998). As a result of stenosis and possible retraction, the cervix, the structure at the opening of the uterus, may also be unidentifiable upon physical exam in postmenopausal women (Smith, 1998).

The Vagina. With age, the vagina becomes shorter and narrower and the vagina walls tend to thin and weaken (Smith, 1998). These structural changes, especially thinning of the vaginal walls and loss of elasticity, increase the chances for vaginal injury in the older female (Digiovanna, 2000). A loss of mucosal layers in the vagina as well as a large decrease in discharge causes a loss of lubrication. As a result, the vagina can become very dry, causing sexual intercourse to be painful (Digiovanna, 2000; Smith, 1998). With age, vaginal pH levels also shift from an acidic environment (3.8–4.2) toward an alkaline environment (6.5–7.5). The shift occurs due to decreased glycogen levels in vaginal tissue, which results in an environment where microbes flourish (Digiovanna, 2000; Smith, 1998). With all of these changes, vaginal infections tend to increase with age (Digiovanna, 2000). The increased rate of infection may also be due in part to shrinkage of the labia majora, part of the external genitalia. As a result of this shrinkage, the labia become separated. This separation in turn exposes a greater surface area upon which microbes and infectious agents can nest (Digiovanna, 2000).

Menopause

Menopause is classified as the complete cessation of menstrual cycles for a period of at least 1 year (Digiovanna, 2000; Hall, 2004; Soules et al., 2001). On average, menopause begins around 51 years of age, but the reproductive changes described in this section begin years earlier (Digiovanna, 2000; Hall, 2004; Joffe et al., 2003). The late reproductive stage begins around 35 years of age with a decrease in fertility marked by a decrease in inhibin B, decrease in

progesterone, a slight increase in estradiol, and an increase in FSH (Hall, 2004; Joffe et al., 2003; Soules et al., 2001). The menopausal transition is defined by declines in estradiol along with the onset of variable menstrual cycles in both early and late stages. Periods of amenorrhea trigger the move into the late stage (Hall, 2004; Soules et al., 2001). Menopause is said to have occurred 1 year after the final menstrual period. The postmenopausal period is characterized by drastic decreases in ovarian hormone functioning and changes in corresponding hormone-related systems such as bone formation and resorption (Hall, 2004; Soules et al., 2001). **Table 6-4** classifies the stages of menopause along with corresponding changes that occur within each stage.

Menopause is usually causally linked with ovarian failure and complete oocyte depletion, but recent research also implicates the hypothalamus and pituitary via a decline in estrogen negative feedback on LH release (Soules et al., 2001; Weiss, Skurnick, Goldsmith, Santoro, & Park,

Case Study 6-1

H.M. is a 72-year-old Caucasian female with a history of osteopenia for the past 4 years and shortness of breath related to 42 years of smoking. She presents today with complaints of painful sexual intercourse and a constant feeling of being cold. Upon questioning, she reports sometimes experiencing dizziness and light-headedness upon standing from a chair. However, she never loses consciousness when standing. She also reports a few episodes of forgetting her two grandchildren's names in the past several months. On evaluation of mental status using the Mini Mental State Exam (MMSE) she scores a 26. On physical exam, she has a blood pressure of 140/89, a weight loss of 6 pounds, and a loss of a 1/2 inch from her height from the previous visit 8 months ago. She reports no discomfort in her back or neck regions. She has no history of stroke, seizure, heart disease, or thyroid disease. H.M. did not begin hormone therapy at any point during or after menopause by her own choosing. She did begin taking calcium supplements during menopause and within the past 5 years began taking over-the-counter herbal estrogen to self-treat some of her noted symptoms.

Questions

1. What steps would you take to address H.M.'s chief complaints for today's visit?
2. List possible labs, tests, therapeutic options, and recommendations for the patient during this visit.
3. Would you address other existing issues or would you reevaluate at the next visit?
4. List potential areas that will be noted for continuing evaluation and possible future treatment.

2004). Estrogen and progesterone are still present in small amounts during early postmenopausal years, but ovarian production of these hormones eventually declines and ceases completely during late postmenopausal years (Chakraborty & Gore, 2004; Digiovanna, 2000). Estrogen levels decrease by 80% by postmenopausal years and progesterone decreases by 60% (Smith, 1998). During menopause, ovaries decrease production of androstenedione by 50%. This decline could help explain loss of libido and energy in the older female (Yialamas & Hayes, 2003). Although some studies have shown that there are slight declines in testosterone levels during and after menopause, others have shown no change in testosterone levels. Thus, the question of whether or not androgen deficiency occurs in older women remains unanswered (Laughlin, Barrett-Connor, Kritz-Silverstein, & von Muhlen, 2000; Yialamas & Hayes, 2003; Zumoff, Strain, Miller, & Rosner, 1995).

Physical symptoms that are often described by menopausal women include hot flashes, mood disturbance, weight gain, vaginal dryness, bladder infections, loss of sex drive, fatigue, insomnia, cognitive decline, hair loss, backaches, and joint pain (Hafez & Hafez, 2004; Joffe et al., 2003). Aging effects on the entire reproductive axis contribute to reproductive aging and eventual menopause in women.

Table 6-4 CLASSIFICATION OF THE STAGES OF MENOPAUSE AND THE CHARACTERISTICS ASSOCIATED WITH EACH STAGE AS DEFINED BY STRAW

Reproductive	Menopausal Transition	Menopause	Postmenopause
Late	**Early/Late**		**Early/Late**
Variable symptoms: vasomotor (hot flashes), breast tenderness, insomnia, migraines, premenstrual anxiety, and/or depression	Early: Menstrual cycle lengths vary Late: Two or more skipped cycles and some amenorrhea	Begins 12 months after the final menstrual period	Early: 5 years since the final menstrual period; ovarian hormone function decreases; increased bone loss Late: 5 years after the final menstrual period until death
Begin FSH elevation, decreased inhibin B, slight increase in estradiol, decreased progesterone	FSH elevation, LH elevation, decreased inhibin B, decreased estradiol	FSH elevation, LH elevation, decreased inhibin B, decreased estradiol	FSH elevation, LH elevation, decreased inhibin B, decreased estradiol, increased GnRH

Source: Soules et al., 2001; Hall, 2004

Male Reproductive Aging

Neuroendocrine Changes

The male reproductive axis also involves the integration of the hypothalamus and pituitary, but for males the gonad involved is the testes (Schlegel & Hardy, 2002; Yialamas & Hayes, 2003). Similar to the female reproductive axis, the hypothalamus secretes GnRH into the blood. GnRH then travels to the pituitary where it stimulates the secretion of the gonadotropins FSH and LH (Schlegel & Hardy, 2002; Seidman, 2003). The gonadotropins travel to the testes where LH stimulates the Leydig cells to produce testosterone while FSH stimulates the Sertoli cells to initiate and maintain sperm production (Schlegel & Hardy, 2002; Seidman, 2003; Yialamas & Hayes, 2003). However, Sertoli cells have the ability to suppress FSH secretion via inhibin B (Schlegel & Hardy, 2002). In males, a negative feedback system between the testes, the hypothalamus, and the pituitary controls the rate of sperm production and testosterone release. This is demonstrated by the relationship between FSH and Sertoli cells as well as by the effect of testosterone on GnRH and gonadotropin secretion (Schlegel & Hardy, 2002; Seidman, 2003; Yialamas & Hayes, 2003). Testosterone is the most available androgen in the male reproductive system, with secretory bursts occurring around six times per day (Partin & Rodriguez, 2002; Seidman, 2003). Testosterone binds to androgen receptors located in the brain and spinal cord, activating cellular mechanisms that influence androgen-dependent tissues (Seidman, 2003).

Age-related changes to the male reproductive axis include increases in FSH and LH levels, decreases in both serum and bioavailable testosterone levels, and a decline in Leydig cell function (Kandeel, Koussa, & Swerdloff, 2001; Morley et al., 1997; Schlegel & Hardy, 2002). Testosterone levels in men decline with age, but can show variability from small decreases to major decreases depending on health status (Seidman, 2003). As testosterone levels decline in older males the amount of estrogen remains stable, leading to a decline in the testosterone-to-estrogen ration (Kandeel et al., 2001). A decline in testosterone is often associated with decreases in libido, spontaneous erections, sexual desire, and sexual thoughts (Seidman, 2003).

Male System Changes

The Testes. In aging, the testes decrease in both size and weight, but with high variability among men (Digiovanna, 2000). The Leydig cells decrease in number but not in structure. In addition, these cells decrease their production of testosterone (Digiovanna, 2000; Yialamas & Hayes, 2003). In contrast, the small amount of estrogen secreted by the testes does not decline with age nor does the estrogen that is aromatized from androstenedione. As a result, the ratio of estrogen to testosterone increases in older males (Partin & Rodriguez, 2002). In stages over time, the seminiferous tubules show thinning of the walls and narrowing of lumen. The lumen can become so narrow that the seminiferous tubules become blocked (Digiovanna, 2000). Other dynamics that may contribute or enhance aging of the structure and function of the seminiferous tubules include decreased blood flow and changes in testosterone production (Digiovanna, 2000). Although a decline in sperm production occurs in aging males, the production never ceases. As a result, the older male remains fertile (Digiovanna, 2000).

Glands. The seminal vesicles and the bulbourethral glands demonstrate no age-related changes (Digiovanna, 2000). However, the biggest concern in older males is changes in the prostate gland. The lining and muscle layer of

the prostate gland become thinner with age, probably due to the reduced blood flow to the area (Digiovanna, 2000). Benign prostatic hyperplasia (BPH), which is dependent on age and androgen production, remains very common in aging males with approximately 50% of men experiencing nodules by age 60 and around 90% by age 85 (Hollander & Diokno, 1998; Letran & Brawer, 1999). By age 60, approximately 13% of males will be diagnosed with clinical BPH that requires medical attention. By age 85, this percentage has increased to 23% (Letran & Brawer, 1999). BPH causes the prostate to grow very large, which may result in urethral blockages (Hafez & Hafez, 2004; Hollander & Diokno, 1998). Common complaints with BPH include increased frequency and discomfort with urination, bladder and kidney infections, and erectile and ejaculatory dysfunction (Hafez & Hafez, 2004; Hollander & Diokno, 1998; Paick et al., 2005; Rosen et al., 2003).

The Penis. The penis begins to show fibrous changes in erectile tissue around the urethra starting in the 30s and 40s. By ages 55 to 60 years, increased fibrosis occurs in all erectile tissues (Digiovanna, 2000). This fibrosis in erectile tissue causes an increase in the amount of time it takes to achieve an erection in the older male; however, the ability to have an erection is maintained with age and is usually most affected by medication or disease (Digiovanna, 2000; Kandeel et al., 2001). In addition to the increase in time to obtain an erection, older males also require more stimulation in order to maintain the erection. In addition, older males generally experience less intense orgasms and ejaculation, decreases in ejaculatory volume, and an increase in the refractory period following ejaculation (Kandeel et al., 2001; Schlegel & Hardy, 2002).

ANDROPAUSE

Andropause is classified as a decline in testosterone levels and eventual deficiency significant enough to cause clinical symptoms (ASRM Practice Committee, 2004; Hafez & Hafez, 2004; Yialamas & Hayes, 2003). Unlike menopause, andropause occurs gradually over time and does not occur in all aging males (Hafez & Hafez, 2004). A decline in the functional ability of the entire reproductive axis causes decreased production of testosterone in aging males (Yialamas & Hayes, 2003). When testosterone is produced in the adult male it stimulates negative feedback of GnRH, FSH, and LH secretion. In the older adult male this negative feedback is enhanced (Yialamas & Hayes, 2003). During andropause, when testosterone becomes extremely low, a recovery mechanism triggers increases in FSH and LH in an attempt to elevate testosterone levels (Hafez & Hafez, 2004). Androgen deficiency in the aging male (ADAM) includes symptoms of low libido; decreased energy, strength, and stamina; increased irritability; and cognitive changes (ASRM Practice Committee, 2004; Janowsky, Oviatt, & Orwoll, 1994; Korenman et al, 1990; Sternbach, 1998; van den Beld, de Jong, Grobbee, Pols, & Lamberts, 2000; Yialamas & Hayes, 2003). Physiological symptoms of ADAM include erectile dysfunction, osteopenia, osteoporosis, breast enlargement, decreased muscle mass, shrinkage of the testes, and increased fat deposition (ASRM Practice Committee, 2004; Greendale, Edelstein, & Barrett-Connor, 1997; Hafez & Hafez, 2004; Turner & Wass, 1997; Vermeulen, Goemaere, & Kaufman, 1999; Yialamas & Hayes, 2003). Diagnosis of andropause generally occurs via measurement of total serum testosterone levels. However, measures of the true testosterone level should be based on total testosterone and testosterone

metabolites as well as androgen receptor activity (Yialamas & Hayes, 2003).

Although the hypothalamus-pituitary-gonadal axis controls both male and female reproductive systems, the age-related changes in the axis and the physiological effects are very diverse. All males and females experience age-related changes in the reproductive system; however, these changes occur with tremendous variability among individuals.

The Nervous System

Introduction to the Nervous System

The two components of the nervous system, central and peripheral, have the potential to affect the entire body through continual communication via nerve innervations and signals. As a person ages, natural changes occur in the nervous systems that can have direct or indirect effects on the rest of the body. The central nervous system consists of the brain and the spinal cord whereas the peripheral nervous system encompasses the motor and sensory neurons located in the sensory-somatic system and the autonomic system (**Figure 6-11**). The autonomic nervous system consists of the motor and sensory neurons that maintain homeostasis within the body. It can be further divided into the parasympathetic and sympathetic systems. Communication among the brain, spinal cord, and peripheral nerves serves as the source responsible for maintenance of homeostasis. This communication process within the nervous system and between organ systems and the nervous system is demonstrated in **Figure 6-12.**

The process of aging in the nervous system could lead to profound effects on other organ systems when considering the constant communication that occurs. Any change in the nervous system has the potential to influence the stability of the entire body, even if minimally. In this section, the age-related changes that occur in the brain, spinal cord, and peripheral nerves will be discussed.

Box 6-1 Research Highlight

Aim/method: The authors conducted two studies for the purpose of examining the hypothesis that cardiovascular fitness can offset declines in cognitive function.

Findings: Study findings showed that increases in cardiovascular fitness resulted in increased functioning of the brain's attentional network during a cognitive challenge. Highly fit individuals exhibited greater brain activity than did either low- or unfit individuals.

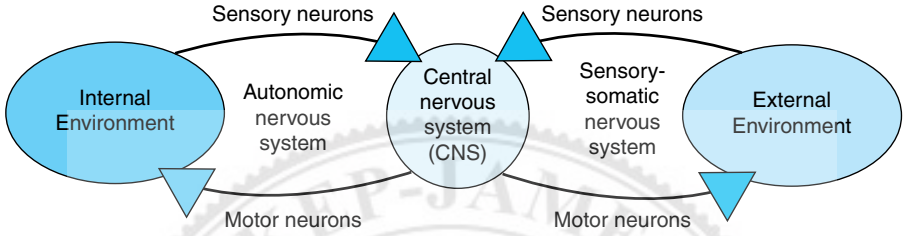
Conclusion: The study results suggest that improvements in cardiovascular fitness can have a positive influence on the plasticity of the aging brain.

Source: Colcombe, S. J., Kramer, A. F., Erickson, K. I., Scalf, P., McAuley, E., Cohen, N. J., Webb, A., Jerome, G. J., Marquez, D. X., & Elavsky, S. (2004). Cardiovascular fitness, cortical plasticity, and aging. *Proceedings of the National Academy of Sciences USA, 101*(9), 3316–3321.

The Aging Brain

The human brain goes through many developmental changes throughout a person's lifespan. Aging should still be considered on a developmental scale, not a decrement scale. Although

Figure 6-11 The central system nervous system and the peripheral nervous system have a constant feedback loop between each system as well as the external and internal environments.



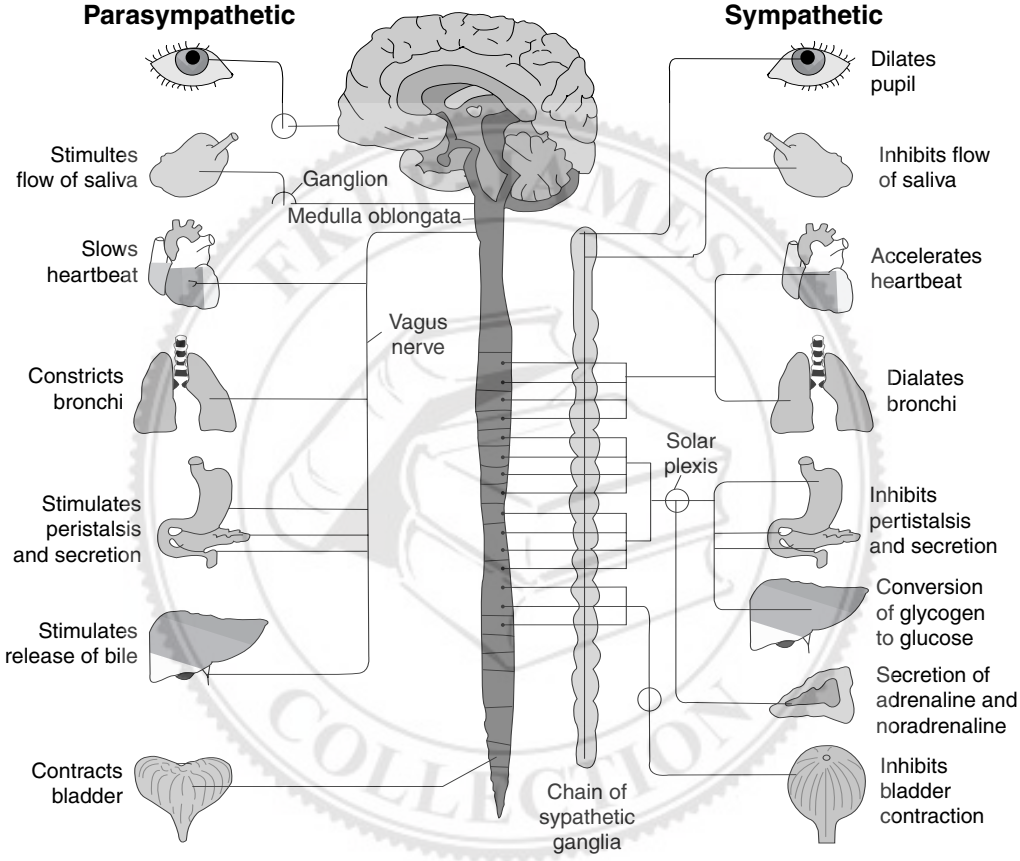
Source: Adapted from John Kimball, Ph.D., *Organization of the nervous system*. Kimball's Biology page, http://users.rcn.com/jkimball.ma.ultranet/BiologyPages/P/PNS.html

brain changes do occur as humans grow older, one should not assume that cognitive function will automatically decline. Memory changes can be observed by the fifth decade, but changes remain variable among individuals. There is also great variation in the type of memory affected (Erickson & Barnes, 2003).

Overall Structural Changes

The brain decreases in size and weight as men and women age (Arking, 1998; Digiovanna, 1994; Minaker, 2004). At birth, the brain weighs approximately 357 grams. Brain weight peaks at about 1,300 grams around the age of 20 years. This weight is maintained until 55 years of age (Arking, 1998). After age 55 there is a decline in brain weight. This decline can result in a brain weight that is 11% smaller than that observed in the young adult brain (Arking, 1998). However, measurements of brain weight may show bias due to individual differences in head size and body weight. Measuring changes in individual brain volume helps to diffuse this inherent bias. Brain volume appears to be stable from age 20 to 60 followed by a significant decline of between 5% and 10% (Arking, 1998; Minaker, 2004). Magnetic resonance imaging (MRI) studies have demonstrated that, compared to women, men demonstrate greater age-related volume loss in the brain as a whole as well as in the temporal and frontal lobes (Leon-Carrion, Salgado, Sierra, Marquez-Rivas, & Dominguez-Morales, 2001; Murphy, DeCarli, Schapiro, Rapoport, & Horwitz, 1992). In the same MRI study, researchers showed that women had a greater loss of volume in the hippocampus and parietal lobes than that observed in men. From ages 30 to 90 years both men and women experience a volume loss of 14% in the cerebral cortex, 35% in the hippocampus, and 26% in the cerebral white matter (Anderton, 2002). Ventricles within the brain enlarge throughout the aging process. Ventricle size at age 90 may be as much as three to four times ventricle size at age 20. Ventricle enlargement may help to explain some loss of brain volume (Beers & Berkow, n.d.; Digiovanna, 1994; Arking, 1998). While the ventricles on the inside of the brain enlarge, the gyri—raised ridges on the surface of

Figure 6-12 The autonomic nervous system serves to maintain homeostasis within the body by constant sensory and motor feedback with the central nervous system.



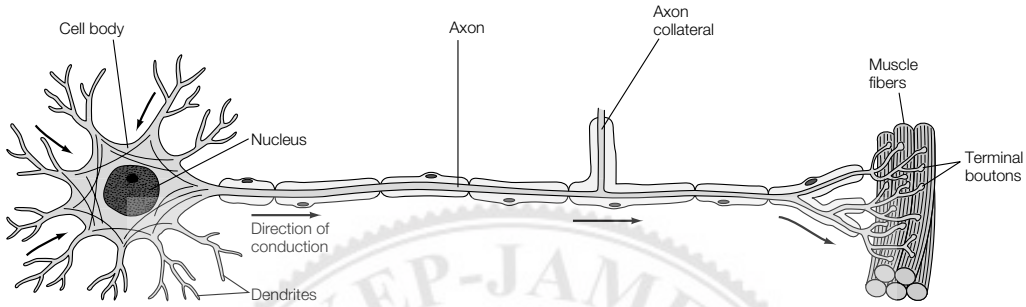
Source: Adapted from John Kimball, Ph.D., *Organization of the nervous system*. Kimball's Biology page, http://users.rcn.com/jkimball.ma.ultranet/BiologyPages/P/PNS.html

the brain—shrink, and the sulci—grooves between the gyri—become wider (Digiovanna, 1994).

Neuron Changes

The brain is composed of gray matter and white matter. The gray matter is located on the surface of the brain, known as the cerebral cortex, and contains the **nerve cell** bodies. The white matter contains no cell bodies or dendrites, but is strictly myelinated nerve fibers (Arking, 1998). **Figure 6-13** demonstrates the composition of a nerve cell and fibers. The average number of neocortical

Figure 6-13 A neuron.



Source: Daniel D. Chiras, *Human biology* (5th ed.). Sudbury, MA: Jones and Bartlett Publishers, 2005.

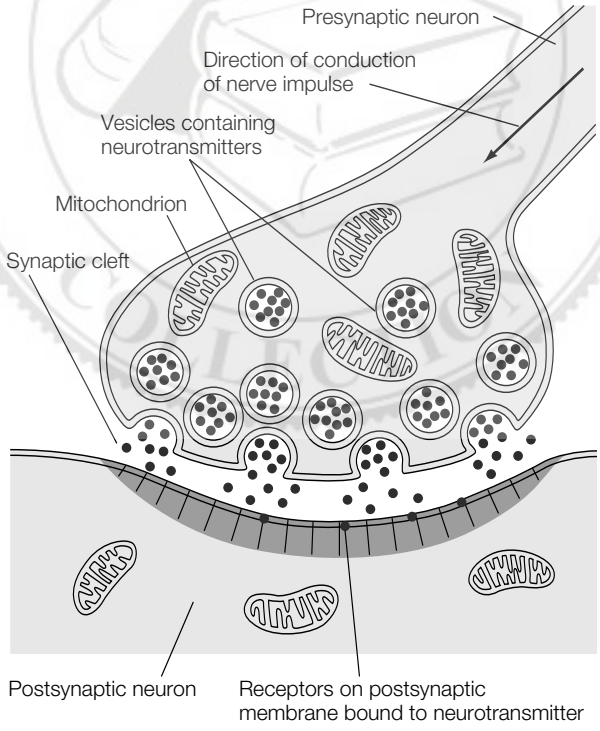
neurons is 19 billion in female brains and 23 billion in male brains, a 16% difference. A study by Pakkenberg and Gundersen (1997) that focused on neuron numbers in 20- to 90-year-old individuals showed that approximately 10% of all neocortical neurons are lost over the life span in both sexes. Cell loss remains minimal in some parts of the brain whereas other areas show tremendous neuron decrease (Katzman, 1995). According to Beers & Berkow (n.d.), neuronal cell loss remains minimal in the brain stem nuclei, paraventricular nuclei, and supraoptic nuclei. Losses in other areas can be great: 10% to 60% in the hippocampus, 55% in the superior temporal gyrus, and 10% to 35% in the temporal lobe. However, recent anatomical studies have not shown any statistically significant age-related change in neuron numbers in the hippocampus, the primary center for learning and memory (Erickson & Barnes, 2003). Unlike previous studies, these recent anatomical studies have taken into account age-related tissue shrinkage and have utilized better-controlled stereological methods in making the determination that no neuronal decreases occur (Anderton, 2002; Peters, 2002). Other sources describe a significant decline of neurons in the cerebrum, which controls voluntary movement, vision, hearing, and other senses. Only a minimal neuronal loss is seen in the cerebellar cortex and the basal ganglia, which are responsible for muscle movement and control (Digiovanna, 1994, 2000). The brainstem demonstrates some loss of neurons in the nucleus of Meynert (acetylcholine production) and the locus coeruleus (norepinephrine production), which aids in sleep regulation (Digiovanna, 1994, 2000).

Early reports of neuron loss should be carefully considered due to the fact that more recent studies have used more carefully controlled human tissue samples, study design, and neuron counting techniques (Peters, 2002). A loss of neurons in the aging brain is present, but not to the extent that researchers have reported in the past (Morrison & Hof, 1997; Peters, 2002; Peters, Morrison, Rosene, & Hyman, 1998). The myelin sheath, which surrounds the axon on every neuron and promotes faster electrical signaling along each neuron, breaks down in aging (Bartzokis et al., 2004; Dickson, 1997;

Peters, 2002). Myelination of the axon appears to continue until middle age, followed by a breakdown in the structural integrity of the myelin (Bartzokis et al., 2004; Dickson, 1997). This degradation of myelin may cause neuronal disruption by slowing the nerve impulses as they travel through the nervous system. This may help to explain mild age-related declines in cognition and motor control (Dickson, 1997).

The loss of a neuron or a decrease in neuron participation causes disruption of neural circuits and hence neural signaling. Dendrites serve as the system through which nerve impulses are relayed to the neuron. The **synapse** serves as the messenger system between dendrites. **Figure 6-14** demonstrates how a synapse works to relay chemical messages between neurons. The number of dendrites and dendritic spines decreases with age, but not uniformly in the brain (Arking, 1998). Several human studies focusing on synapse change in different areas of the brain throughout the lifespan have shown no significant change (Scheff, Price, & Sparks. 2001). However, significant synapse loss has been shown in multiple

Figure 6-14 A synapse and synaptic transmission.



Source: Daniel D. Chiras, *Human biology* (5th ed.). Sudbury, MA: Jones and Bartlett Publishers, 2005.

brain areas in postmortem Alzheimer's disease tissue when compared to control tissue (Lippa, Hamos, Pulaski, Degennaro, & Drachman, 1992; Scheff & Price, 1998, 2001; Scheff, Sparks, & Price, 1996).

The brain demonstrates remarkable compensatory mechanisms to recover from loss, even in old age. **Plasticity,** or the ability to lengthen and/or form new neuronal connections onto available existing neurons, is one of these compensatory mechanisms (Beers & Berkow, n.d.; Digiovanna, 1994, 2000). Plasticity can occur through many avenues including **neurogenesis**, **synaptogenesis**, synaptic alteration, synaptic efficacy, long-term potentiation, axon sprouting, and dendrite transformation (Teter & Ashford, 2002). An example of synaptic alteration is **synapses**' ability to broaden and cover more surface area, possibly compensating for synapse loss in some brain areas (Digiovanna, 1994, 2000; Terry, DeTeresa, & Hansen, 1987). In aging or injury, new neuronal connections specifically compensate for the loss of neurons in certain brain areas in order to aid in preservation of function (Beers & Berkow, n.d.). Plasticity does diminish with age, but is not completely lost. Aging effects include a decrease in long-term potentiation and synaptogenesis in addition to delays in axon sprouting that in turn affect the formation of new connections (Tete & Ashford, 2002).

NEUROTRANSMITTER CHANGES

A **neurotransmitter** is a chemical messenger encapsulated in synaptic vesicles that travels down the axon through the dendrite into the synaptic space and onto corresponding receptors on the postsynaptic neuron. Neurotransmitter changes during the aging process can influence memory and cognition as well as behavior and motor function.

Cholinergic. **Cholinergic neurons**, which release the neurotransmitter acetylcholine, play a significant role in learning and memory in humans and animals (Arking, 1998; Mattson, 1999). Acetylcholine induces learning and memory via cholinergic input to the hippocampus and neocortex in the brain (Kelly & Roth, 1997; Mattson, 1999). With age, acetylcholine synthesis and release from synaptic vesicles begin to decline. The postsynaptic acetylcholine receptors, known as nicotinic and muscarinic receptors, and transport of choline also demonstrate age-related deficits (Beers & Berkow, n.d.; Kelly & Roth, 1997; Mattson, 1999). In Alzheimer's disease these cholinergic deficits are more pronounced, which led to the development of acetylcholinesterase inhibitor medications now on the market to treat the disease. The objective of the medication is to decrease the degradation of acetylcholine in the synaptic space, thereby increasing the amount of acetylcholine available to bind with postsynaptic receptors.

Dopaminergic. The **dopaminergic system** involves the neurotransmitter dopamine, mainly in the substantia nigra and striatum (Arking, 1998). In aging, dopamine levels decrease and dopamine transport in the neuron also diminishes (Katzman, 1995; Mattson, 1999). Age-related changes are also found in dopamine receptors. In addition, the ability of dopamine to bind to postsynaptic receptors also decreases (Katzman, 1995; Mattson, 1999). Positron emission tomography (PET) studies have shown a decline in dopamine receptors located in the caudate and putamen of the aging brain (Mozaz & Monguio, 2001). In Parkinson's disease, dopamine levels are greatly decreased, leading to the hallmark symptom of diminished motor control. Decreases in dopamine with age may explain some age-related motor deficits as well

as motor dysfunction resulting from the use of medications targeting the dopaminergic neurotransmitter system (Kelly & Roth, 1997; Mattson, 1999; Mozaz & Monguio, 2001; Volkow et al., 1998).

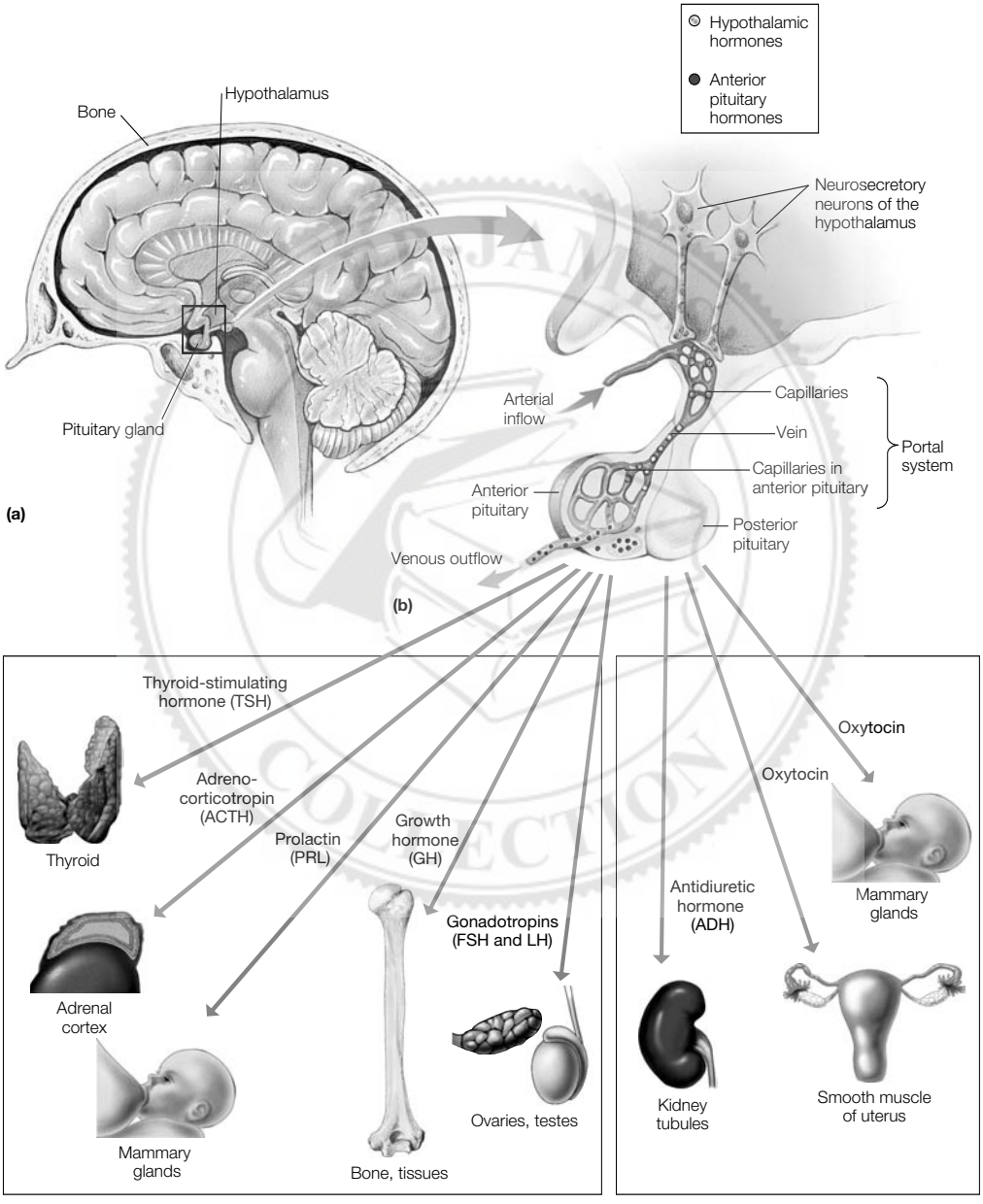
Monoaminergic. The **monoaminergic system** consists mainly of the neurotransmitters norepinephrine and serotonin located in the locus ceruleus and the raphe nucleus (brainstem), respectively (Arking, 1998; Kelly & Roth, 1997; Mattson, 1999). Norepinephrine tends to increase with age in certain brain regions, but corresponding receptors have been shown to decrease in both humans and animals (Gruenewald & Matsumoto, 1999; Mattson, 1999). Serotonin levels and receptor binding sites both decrease with age, which may play a role in depression and sleep changes later in life (Mattson, 1999; Ramos-Platon & Beneto-Pascual, 2001).

Amino Acid Transmitters. The **amino acid neurotransmitters** consist mainly of glutamate, the major excitatory neurotransmitter, and gamma-aminobutyric acid (GABA), the major inhibitory neurotransmitter (Kelly & Roth, 1997; Mattson, 1999). The hippocampus, a central location for learning and memory, contains high levels of glutamate. This relationship between glutamate and memory leads to a questioning of the idea that memory decline is strongly tied solely to acetylcholine depletion (Kelly & Roth, 1997). Glutamate receptors decline with age, but the change in glutamate with age is unknown (Mattson, 1999). The overstimulation and release of glutamate may be significant in Alzheimer's disease, Parkinson's disease, and Huntington's disease as well as stroke (Mattson, 1999). GABA concentrates in the brain areas of the substantia nigra and the globus pallidus (Kelly & Roth, 1997). Age-related changes in the GABA neurotransmitter are unknown; however, decreases in GABA have been correlated with aggressive behavior (Jimenez, Cuartero, & Moreno, 2001; Mattson, 1999). GABA can synthesize glutamate, which can convert to GABA via the enzyme glutamic acid decarboxylase (Gluck, Thomas, Davis, & Haroutunian, 2002). So, changes in glutamate could have a direct or indirect effect on GABA in the aging brain and vice versa.

Neuroendocrine Changes

Age-related changes to neuroendocrine functioning affect many other systems in the body. **Figure 6-15** demonstrates body systems that are controlled and/or affected by changes in neuroendocrine functioning with an emphasis on the pituitary gland. Aging changes in secretion of hypothalamic-releasing hormone are studied indirectly by observing changes in pituitary secretion response to hypothalamic-releasing hormone, to chemicals that block feedback mechanisms, and to chemicals that stimulate the release of hypothalamic-pituitary hormone (Gruenewald & Matsumoto, 1999). One example of a neuroendocrine age-related change is the reproductive axis or the hypothalamic-pituitary-gonadal axis that controls the regulation of male and female hormones (Chakraborty & Gore, 2004; Hall, 2004). (Refer to "The Reproductive System" earlier in this chapter for further discussion of age-related neuroendocrine function of gonadal hormones.) Another example is the **hypothalamic-pituitary-adrenal (HPA) axis** that integrates the endocrine, immune, and nervous systems. This integration allows for great adaptability (Ferrari et al., 2001). The HPA axis regulates glucocorticoid levels in the body and allows the body to respond to stressful conditions (Ferrari et al., 2001; Gruenewald & Matsumoto, 1999). Age changes in the negative feedback system of glucocorticoids on the

Figure 6-15 The pituitary gland.



Source: Daniel D. Chiras, *Human biology* (5th ed.). Sudbury, MA: Jones and Bartlett Publishers, 2005.

HPA axis may cause glucocorticoids to circulate for longer periods of time. Consequently, damage may occur to hippocampal neurons needed for cognitive function (Gruenewald & Matsumoto, 1999).

In the central nervous system, the neurotransmitters dopamine and norepinephrine affect hypothalamic and pituitary hormone release, and with age these neurotransmitters cause changes in hormone secretions (Gruenewald & Matsumoto, 1999). Hypothalamic neurons release dopamine that inhibits prolactin release from the pituitary. Prolactin stimulates dopaminergic neurons in the hypothalamus, but with age dopaminergic changes can lead to deregulation of prolaction secretion (Gruenewald & Matsumoto, 1999). Norepinephrine levels have been shown to increase in certain brain areas even with a decrease in noradrenergic neurons and receptors (Mattson, 1999). An age-related increase in norepinephrine could affect the release of growth hormone, thyroid-stimulating hormone (TSH), and leutinizing hormone (LH) from the pituitary gland (Gruenewald & Matsumoto, 1999). Neuroendocrine changes with age have the potential to affect many systems in the body via hormone alterations. These changes are an example of how the nervous system plays an integral role in every aspect of the human body.

Vascular Changes

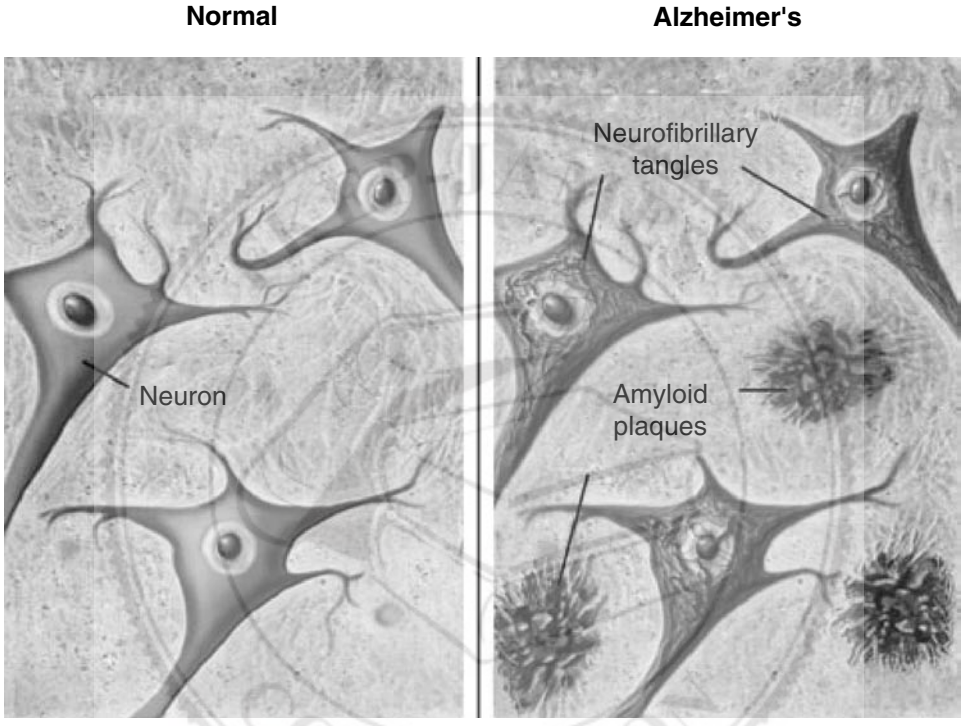
Cerebral blood flow decreases with age, reportedly by an average of 20%. Decreased blood flow is accompanied by decreased glucose utilization and metabolic rate of oxygen in the brain (Arking, 1998; Beers & Berkow, n.d.; Dickson, 1997; Mattson, 1999). According to Katzman (1995), the National Institute of Mental Health longitudinal study revealed that individuals with an average age of 70 years were comparable in cerebral blood flow to individuals with an average age of 20.8 years. However, an 11-year follow-up showed that the older cognitively intact participants had a significant reduction in cerebral blood flow, leading to the conclusion that the eighth decade of life was a turning point. The rate of blood flow in women decreases slightly more rapidly than in men; however, blood flow is usually greater in women than in men until age 60 (Beers & Berkow, n.d.). Potential explanations for decreased cerebral blood flow include cerebrovascular disease, structural changes in cerebral blood vessels, and neuron loss accompanied by a reduction in blood flow need (de la Torre, 1997). Cerebral blood vessels display less elasticity and increased fibrosis, which may lead to increased vascular resistance (Mattson, 1999).

The blood–brain barrier shows age-related degradation of capillary walls. This degradation affects the ability of nutrients such as glucose and oxygen to nourish the brain (Arking, 1998; de la Torre, 1997; Mattson, 1999). In conjunction with the inability to effectively nourish the brain, changes in capillaries could also prevent waste byproducts from effectively exiting the blood–brain barrier and in turn causing a build-up of potentially neurotoxic substances (de la Torre, 1997).

Plaques and Tangles

β-amyloid **plaques** and neurofibrillary **tangles** are considered hallmarks of Alzheimer's disease (**Figure 6-16**), but both can be found in older individuals without evidence of dementia (Anderton, 2002; Beers & Berkow, n.d.; Dickson, 1997; Schmitt et al., 2000). Plaques occur outside of the neuronal cell and consist of grey matter with a protein core surrounded by abnormal neurites (Anderton, 2002). Each plaque consists of a core of protein with the dominant protein

Figure 6-16 The difference between control and Alzheimer's disease tissue in relation to amyloid plaques and neurofibrillary tangles. Plaques and tangles can be present in control tissue with no signs of memory problems.



Source: Image courtesy of Alzheimer's Disease Research, a program of the American Health Assistance Foundation, http://www.ahaf.org/alzdis/about/plaques_tanglesBorder.jpg

being amyloid β-peptide, which is formulated from a larger protein known as amyloid precursor protein (Anderton, 2002; Dickson, 1997). This amyloid β-peptide has been shown to be neurotoxic, inducing oxidative stress and stimulating inflammatory processes (Mattson, 1999). However, in the aging brain plaques are disseminated unlike in the Alzheimer's disease brain where plaques are very numerous and dense (Dickson, 1997).

Neurofibrillary tangles occur in the neuronal cell body and consist of paired helical filaments and a few straight filaments (Anderton, 2002; Dickson, 1997). The main protein associated with neurofibrillary tangles is known as tau, a phosphoprotein that supports microtubule stability (Binder, L., Guillozet-Bongaarts, Garcia-Sierra, & Berry, 2005; Dickson, 1997). In neurofibrillary tangles, tau protein undergoes abnormal phosphorylation and increases in den-

sity (Dickson, 1997). In aging, tangles are found in very low numbers and usually concentrate in areas of the entorhinal cortex, hippocampus, and amygdala (Anderton, 2002; Dickson, 1997; Mattson, 1999). In the aged brain, the greatest density of tangles appears in the entorhinal cortex, whereas in the Alzheimer's disease brain plaques spread throughout the entire cortex (Dickson, 1997).

Free Radicals

A **free radical** is a molecule with an unpaired electron in the outer shell of electrons. A free radical remains unstable until paired with another molecule (Mattson, 1999). In humans, oxygen is the major molecule in the generation of free radicals. Although the brain makes up only 2% of total body weight, it consumes around 20% of the total oxygen uptake (Benzi & Moretti, 1997). In the cell, mitochondria continuously emit oxygen free radicals during the electron transport process, which manifests oxidative stress and can cause oxidative damage (Benzi & Moretti, 1997; Mattson, 1999; Sohal, Mockett, & Orr, 2002). Antioxidants and repair mechanisms for oxidative stress in biological systems are covered under the oxidative stress hypothesis (see Chapter 2). Oxygen free radicals, or oxyradicals, continually increase and accumulate with age, causing oxidative damage to lipids, proteins, and DNA in human tissue including the brain (Mattson, 1999; Sohal et al., 2002). Oxidative damage to proteins, such as cell membrane proteins, could be highly significant in brain aging. Such damage can result in loss of structural integrity and subsequent cell dysfunction and neuron degeneration (Mattson, 1999; Sohal et al., 2002). Nuclear DNA in the nervous system does not incur much oxidative damage in aging; however, oxidative damage is tremendous in mitochondrial DNA because mitochondria are the main source of free radical production (Mattson, 1999). A decrease in available cell energy and impairment in cell metabolism could be mechanisms in promoting free radical production with age (Mattson, 1999; Sohal et al., 2002).

The Aging Spinal Cord

Cells

Overall, the number of spinal cord cells remains stable until around age 60 and then declines thereafter (Beers & Berkow, n.d.; Digiovanna, 1994). Interneuron loss in the lower spinal cord has been reported. Neuron decrements of up to 25% to 45% are observed in those neurons of the spinal layer that correlate to the cerebral cortex (Arking, 1998).

Nerve Conduction

According to Abrams and colleagues (1995), the aging spine may narrow due to pressure on the spinal cord resulting from bone overgrowth. Due to this narrowing, spinal cord axons decrease and can eventually cause changes in sensation. However, these effects may be correlated not only with age, but also with degenerative disease processes or compression of spinal disks that clamp nerves (Beers & Berkow, n.d.). An MRI study by Ishikawa and colleagues (2003) focused on age-associated changes of the cervical spinal cord and spinal canal. These researchers concluded that the transverse area of the cervical spinal cord decreased with age and the spinal canal narrowed with age. These aging changes may directly or indirectly affect motor control and/or sensory systems in the body.

The Aging Peripheral Nervous System

The peripheral nervous system contains approximately 100 billion **nerve cells**. These cells form

nerve fibers that cascade throughout the body, connecting the central nervous system to the rest of the body. Hence, these cells work as a relay messenger system (Abrams, Beers, & Berkow, 1995). The somatic nervous system connects the brain and spinal cord to skeletal muscles and sensory receptors. The autonomic nervous system regulates organ function through activation of nervous system response and through inhibition of parasympathetic response (Abrams et al., 1995). See Figure 6-12 for a diagram of the autonomic pathway of the peripheral nervous system. Nerve conduction speed slows with age as a result of the degradation of the myelin sheaths that coat axons (Bartzokis et al., 2004; Beers & Berkow, n.d.; Mozaz & Monguio, 2001; Peters, 2002). Changes in motor speed, such as reaction times to stimuli, and changes in sensory abilities, such as changes in taste or smell, may be explained by these age-related changes in the peripheral nervous system.

Sensory Neurons

Sensory neuron function declines with age, leading to alterations in reflexes and voluntary actions and influencing certain quality of life areas such as memories, thoughts, and emotion (Digiovanna, 1994, 2000). The sense of touch changes with age due to changes in the touch receptors, or Meissner's corpuscles, and the pressure receptors, or Pacinian corpuscles. However, only small changes in sensory neurons related to touch are observed (Digiovanna, 1994, 2000). Sensory neurons for smell, or olfactory neurons, decrease with age, causing a lessened ability to detect and identify certain smells. This dampened ability could affect eating habits and, due to the inability to detect toxic fumes, may also place older adults in potentially dangerous situations (Digiovanna, 1994, 2000). The sense of taste involves the flavors of salty, sweet, sour, and bitter. Aging changes occur on an individual basis, usually affecting salty and bitter flavors, with salty flavors declining the most (Digiovanna, 1994, 2000). However, the sense of smell may also play a significant role in the age-related changes in taste. This may occur because of the strong link between certain food aromas and taste expectations. The sense of taste has a rapid compensatory response to injury, such as burning the tongue with hot food, and even aging. This compensatory response is characterized by replacement of taste receptors and sensory neurons (Digiovanna, 1994, 2000). Other sensory neurons that decline with age affect the monitoring of blood pressure, thirst, urine in the bladder, and fecal matter in the intestine and rectum. Bone, joint, and muscle position and function are also affected by age-related changes in sensory neurons (Digiovanna, 1994, 2000).

Somatic Motor Neurons

With age, there is a decrease in the number of motor neurons. As a result, there is a reduction in the number of muscle cells and consequent muscle degeneration and weakness (Digiovanna, 1994, 2000). Age changes in the remaining motor neurons include myelin breakdown and cell membrane damage. These changes lead to slower relay of messages that in turn alters the ability of the muscle to contract and relax (Bartzokis et al., 2004; Digiovanna, 1994, 2000). Changes in both sensory and motor peripheral nerve pathways cause voluntary movements to become slower, less accurate, and less coordinated with age (Digiovanna, 1994). These aging changes that affect muscle strength and movement abilities can be lessened with daily exercise aimed at increasing and retaining the performance of remaining muscle.

Autonomic Motor Neurons

Aging causes changes to both the sympathetic and parasympathetic pathways to organ systems. One example of these changes is seen in the body's response to change in blood pressure. When blood pressure drops too low, sympathetic neurons usually help to increase blood pressure by stimulating the heart and constricting blood vessels. However, with age the sympathetic response is delayed, causing low blood pressure and subsequent orthostatic hypotension. When blood pressure rises, the parasympathetic pathway helps to slow the heart rate. But with age this function declines, resulting in elevated blood pressure as well as a decrease in the time required to return to homeostasis (Digiovanna, 1994, 2000). Autonomic neuron age-related changes can also affect thermoregulation. The sympathetic pathway normally acts to constrict blood vessels, thereby preventing heat loss in cold conditions. However, with age there is a decline in this action and this decline, together with age-related changes in blood vessels, results in increased risk of hypothermia (Digiovanna, 1994, 2000). Other age-related changes in the autonomic pathway that affect vision, swallowing, and sexual arousal will be covered in other sections of this chapter.

Injury Responsiveness

Throughout life, peripheral nerve injury is usually repaired through new axon growth and nerve reinnervation of the damaged area, but age decreases these reparative properties (Beers & Berkow, n.d.). These changes in the peripheral nervous system cause older individuals to become slower in detecting and recognizing stimuli, thereby making actions and reactions more difficult (Digiovanna, 1994).

The nervous system remains the most integral organ system in the body due to its influence on every other organ system. Age-related changes that occur at the central and peripheral nerve levels can directly and indirectly influence the homeostasis of the entire body. When observing an age-related change in the older adult, professionals need to broaden their scope of observation to integrate other body systems so that they may better understand the aging changes in the person as a whole.

The Endocrine System

The endocrine system consists of various glands, groups of cells that produce and secrete chemical messengers known as **hormones**. Hormones transfer information from one set of cells to another as they work to maintain overall homeostasis and regulate the body's growth, metabolism, and sexual development and function. The major glands comprising the endocrine system are the hypothalamus, pituitary gland, thyroid, parathyroids, pineal gland, adrenal glands, and the reproductive glands (ovaries and testes). The pancreas together with its hormones is also considered part of the endocrine system. Age-related changes to the endocrine system as a whole are best presented through individual discussion of the glands, their hormones, and the functions they perform.

The Hypothalamus and Pituitary Gland

The hypothalamus is a collection of cells located in the lower, central portion of the brain, and it provides a link between the nervous system and endocrine systems. Nerves within the hypothalamus produce **hypophysiotropic** hormones that either stimulate or suppress the secretion of hormones from the pituitary gland. Thus, the hypothalamus acts primarily as a mechanism of control for pituitary hormone secretion. The

hypothalamus provides hormonal messages to the pituitary, which in turn produces and secretes its own hormones.

The pituitary gland, only the size of a pea, is located just below the hypothalamus at the base of the brain. It is often termed the "master gland" because it produces hormones that regulate numerous other endocrine glands. These regulatory hormones include growth hormone, vasopressin, thyrotropin, and corticotropin. Growth hormone and vasopressin will be discussed here, and thyrotropin and corticotropin will be discussed with the thyroid and adrenal glands, respectively.

Growth Hormone

Growth hormone (GH) is released from the pituitary gland in response to growth hormone-releasing hormone (GRH) secreted by the hypothalamus. GH stimulates the uptake of amino acids into cells and the synthesis of proteins from these amino acids. In so doing, GH promotes the growth of bone, muscle, and other body tissues. Growth hormone also plays a role in the body's handling of nutrients because it causes increased breakdown of fat for energy. In addition, GH is known to act antagonistically to insulin and increase blood sugar levels (see the discussion of the pancreas and its function later in this chapter).

There is some evidence to suggest that with advancing age there is a decline in the level of GH. The reason for this observed decline has not been well defined, but may involve changes in the diurnal rhythm of GH secretion. In young adults, GH secretion and blood levels of GH rise during the night, reaching a nocturnal peak during the first 4 hours of sleep (P. S. Timiras, 2003a), and taper off toward morning, with GH levels reaching a minimum during the day. Results from studies examining age-related changes in GH show an overall decrease in nightly GH secretion as well as a dampening of the hormone's nocturnal peak (Prinz, Weitzman, Cunningham, & Karacan, 1983). It is thought that over time the nightly increase in GH secretion may cease completely and become constant at all times (Digiovanna, 1994). Whatever the mechanisms behind it, the age-related decline in GH is of great importance because it contributes to age-associated loss of muscle mass and decreased bone formation (P. S. Timiras, 2003a).

Vasopressin

Vasopressin, also known as antidiuretic hormone (ADH), is secreted by neurons that originate in the hypothalamus and extend into the pituitary gland. Vasopressin works to regulate homeostatic levels of osmotic pressure and blood pressure. The release of vasopressin is stimulated by either a decrease in blood pressure or an increase in osmotic pressure. Once secreted, vasopressin promotes water reabsorption by the kidneys. This reabsorption of water prevents increases in the body's osmotic pressure and helps to maintain a substantial blood volume, thereby preventing blood pressure from becoming too low. Vasopressin secretion also helps to maintain blood pressure by stimulating the constriction of blood vessels. The release of vasopressin is inhibited by increased blood pressure or decreased osmotic pressure as well as by alcohol. Decreased levels of vasopressin result in the loss of water through the urine. This fluid loss leads to increases in osmotic pressure as well as decreases in blood volume and blood pressure.

With age there is an average increase in levels of circulating vasopressin. However, this age-related increase does not produce a subsequent

rise in water reabsorption as would be expected (P. S. Timiras, 2003a). The reason for this is unclear, but most research suggests that the failure to respond to increased vasopressin levels with increased water reabsorption occurs primarily in individuals with kidney infections or hypertension and, thus, should not be viewed as a usual characteristic of the aging process (P. S. Timiras, 2003a). In general, age-related changes in vasopressin levels are not known to have significant effects on body homeostasis. Furthermore, the ability of vasopressin to respond appropriately to low blood pressure remains unchanged with age.

The Thyroid Gland

T4 and T3

The **thyroid** is a small, butterfly-shaped gland located in the lower front portion of the neck. The secretion of the thyroid hormones, **thyroxine (T4)** and **triiodothyronine (T3)**, occurs through collaboration with the hypothalamus and pituitary glands. The hypothalamus produces and secretes thyrotropin-releasing hormone (TRH), which in turn stimulates the secretion of **thyroid-stimulating hormone (TSH)** from the pituitary gland. Finally, TSH stimulates the synthesis and secretion of T4 and T3. Then, in a so-called negative feedback loop, T4 and T3 inhibit TSH secretion. Thus, with higher levels of T4 and T3, levels of TSH are lower and vice versa. In addition to its role of regulating the T4 and T3 levels, TSH acts to maintain the growth and structural integrity of the thyroid gland. An absence or deficit of TSH results in atrophy of the thyroid (P. S. Timiras, 2003c).

During the early years of life, the thyroid gland is essential for growth of the whole body and its organs as well as development and maturation of the central nervous system. In adulthood, however, the thyroid functions mainly to regulate the body's metabolic rate. T4 and T3 both promote an increase in metabolic rate. Heat is a byproduct of the metabolic process and, hence, increased metabolic rate leads to an increase in heat production. Thus, the thyroid hormones also act to regulate body temperature. The thyroid gland is not essential for life (P. S. Timiras, 2003c); however, without this gland there is a slowing of the metabolic rate, general lethargy, and a poor resistance to cold. In contrast, abnormally high levels of the thyroid hormones result in a potentially dangerous elevation of metabolic rate.

As the body ages, thyroid hormone levels decrease slightly yet remain in the lower range of normal. In contrast, TSH levels are generally in the high normal range. Borderline abnormal values of T4, T3, and TSH are more common in women than men (P. S. Timiras, 2003c). However, there is a large degree of variability in these hormone levels among older adults, and hormone levels may depend on age and general health as well as gender. Yet, in general, the ability of the thyroid and its hormones to provide metabolic and thermal regulation is not impaired with age.

Calcitonin

Most thyroid cells produce T4 and T3, but some cells—known as c cells—produce a hormone called **calcitonin**. Calcitonin promotes a decrease in blood calcium by stimulating increased uptake of calcium by bone-forming cells. Conversely, calcitonin inhibits the action of cells involved in the breakdown of bone. Unlike secretion of T4 and T3, calcitonin secretion does not involve the hypothalamus or pituitary. Instead calcitonin release is regulated by blood calcium levels. High levels of calcium

trigger the secretion of calcitonin. Calcitonin then causes calcium to be removed from the blood, thereby lowering blood calcium levels. The lower calcium levels then feed back and inhibit calcitonin secretion.

Little is known about age-related changes in calcitonin; however, there have been some reports of decreased calcitonin levels with age. Such a decrease would have profound effects on older persons' risk of osteoporosis given the effects of calcitonin on bone formation and breakdown.

The Parathyroid Gland

The **parathyroid gland** consists of groups of cells located on the back of the thyroid gland. The parathyroid gland secretes a hormone known as **parathyroid hormone (PTH)**. PTH acts antagonistically to calcitonin, and homeostasis of blood calcium depends heavily on a proper balance between PTH and calcitonin. PTH release is stimulated by low blood calcium levels whereas elevated calcium levels inhibit PTH secretion. Thus, PTH works to raise blood calcium levels. It does this through a variety of mechanisms including the removal of calcium from bone, the decline of calcium release into the urine by the kidneys, and the activation of vitamin D by the kidneys, which in turn stimulates calcium absorption by the small intestine.

In children and young adults, calcium levels are maintained through the consumption and subsequent intestinal absorption of dietary calcium. At these ages maintenance of blood calcium levels has no effect on bone (P. S. Timiras, 2003c). However, in older persons calcium levels are maintained primarily through calcium reabsorption from bone. The reason for this shift in mechanisms of calcium level regulation is not fully understood. However, it is thought that with age PTH may have a decreased ability to stimulate production of active vitamin D by the kidneys and/or that active vitamin D may be impaired in its ability to stimulate intestinal absorption of calcium.

The Pineal Gland

The **pineal gland**, a tiny gland located deep within the brain, secretes the hormone **melatonin**. Secretion of melatonin is highly influenced by light properties, including light intensity, length of light exposure, and light wavelength (i.e., color; Digiovanna, 1994). Detection of increased light exposure (day) inhibits melatonin secretion whereas detection of decreased light exposure (night) stimulates hormone secretion. Hence, blood levels of melatonin follow a diurnal rhythm with hormone levels highest at night and lowest during the day. It is melatonin that synchronizes internal body functions with a day–night cycle that shifts in response to seasonal changes in the length of the day–night cycle (P. S. Timiras, 2003c).

Age is accompanied by a decline in melatonin levels. This decline can have a negative impact on other diurnal rhythms such as sleep patterns. Melatonin is known to reach peak concentrations during sleep, and administration of doses of melatonin equivalent to nighttime levels have been shown to promote and sustain sleep (P. S. Timiras, 2003c). Thus, age-related declines in melatonin may be linked to the poor sleep quality and insomnia of some elderly persons.

The Adrenal Glands

The **adrenal glands** are paired glands located above the kidneys. Each gland is composed of an outer region known as the **adrenal cortex** and an inner region known as the **adrenal medulla**.

The Adrenal Cortex

The adrenal cortex secretes three types of hormones; **glucocorticoids**, **mineralocorticoids**, and sex hormones. Secretion of both glucocorticoids and sex hormones from the adrenal cortex is stimulated by pituitary **adrenocorticotropic hormone (ACTH)**. The secretion of ACTH follows a diurnal rhythm and is itself stimulated by **corticotropin-releasing hormone (CRH)** from the hypothalamus. Thus, release of glucocorticoids and sex hormones from the adrenal cortex relies on a hypothalamic-pituitary-adrenal pathway or axis.

Glucocorticoids. Glucocorticoids have several metabolic functions. These include increased amino acid uptake and glucose production by the liver, decreased amino acid uptake and protein synthesis in muscle, inhibition of somatic (nonreproductive) cell growth, suppression of growth hormone secretion from the pituitary gland, and mobilization of lipids and cholesterol. Glucocorticoids also have anti-inflammatory actions including the inhibition of inflammatory and allergic reactions.

The primary glucocorticoid in humans is **cortisol**. Cortisol is synthesized from cholesterol, and its synthesis follows the diurnal rhythm of ACTH release. Cortisol levels are highest in the early morning hours and lowest in the evening. However, both ACTH and cortisol can be secreted independent of this diurnal rhythm under periods of physical or psychological stress (Aeron Biotechnology, 2005). Cortisol is, in fact, often referred to as the stress hormone because it promotes the production of increased energy necessary for dealing with stress.

When cortisol is secreted it stimulates a breakdown of muscle protein, releasing amino acids that can in turn be used by the liver to produce glucose for energy. Cortisol also makes fatty acids, an energy source from fat cells, available for use. The net effect is an increase in energy supply that allows the brain to more effectively coordinate the body's response to a stressor. The increased energy supply also helps the muscles to respond quickly and efficiently to a stressor or threat that requires a physical response.

Early research suggested that cortisol secretion decreases slightly with advancing age, but that this decreased secretion is compensated for by a simultaneous decrease in cortisol excretion from the body. As a result, normal cortisol levels would be maintained as a person ages. More recent studies, however, suggest that as long as individuals are healthy, cortisol secretion remains unchanged with age (P. S. Timiras, 2003a, 2003c).

Studies conducted in animals have provided evidence that under stressful conditions corticosterone (equivalent to the human cortisol) is more elevated among old than young animals. In addition, this elevated level persists for a longer period of time in some older animals. It has been hypothesized that the high levels of corticosterone following a stressor represent a loss of resiliency of the HPA axis such that the axis fails to decrease ACTH in response to elevated corticosterone levels and, consequently, fails to stop corticosterone release once the stress has passed. In rats, there is evidence that the elevated levels of corticosterone may be toxic to the brain, particularly the hippocampus. To date there is little evidence to support an age-related decline in the competence of the HPA axis among humans. However, given the age-associated changes found in animal models, further study of the changes in the HPA axis among older humans is warranted (P. S. Timiras, 2003a).

Clearly, glucocorticoids stimulate a beneficial response during times of stress. However,

glucocorticoids also have some undesirable effects including suppression of cartilage and bone formation, stimulation of bone demineralization, inhibition of portions of the immune response, and promotion of gastrointestinal tract bleeding and ulcer formation (Digiovanna, 1994). When glucocorticoids are administered therapeutically for their anti-inflammatory effects, their concentration in the blood can rise to extremely high levels. Excessively high levels of glucocorticoids exacerbate their aforementioned negative physiological effects. Given that older persons are generally at greater risk for osteoporosis and infection as well as high blood pressure, therapeutic administration of glucocorticoids in this population should be carefully monitored.

Mineralocorticoids. The mineralocorticoids derive their name from their critical role in regulating extracellular concentrations of minerals, principally sodium and potassium. The primary mineralocorticoid is **aldosterone**, which targets the kidneys. Aldosterone has three major physiological effects—increased renal reabsorption of sodium or decreased urinary secretion of sodium; increased renal reabsorption of water and consequent expansion of extracellular fluid volume, and increased renal excretion of potassium. These physiological effects of aldosterone aid in the maintenance of fluid–electrolyte balance within the body. In addition aldosterone helps to maintain blood pressure through its effects on sodium and water retention and increased fluid (i.e., blood) volume (P. S. Timiras, 2003a).

Secretion of aldosterone is stimulated primarily through the release of the enzyme renin from the kidneys and activation of the renin-angiotensin-aldosterone system. Renin is released in response to low blood pressure, increased osmotic pressure, and adverse changes in sodium concentrations. Once released, renin promotes the production of angiotensin, a peptide that then stimulates secretion of aldosterone (P. S. Timiras, 2003a). Conversely, high blood pressure, decreased osmotic pressure, and favorable changes in sodium concentrations will inhibit the release of renin and activation of the renin-angiotensin system. As a result, the production and release of aldosterone is suppressed (Digiovanna, 1994).

The stimulation and suppression of aldosterone also have secondary regulatory mechanisms. The release of aldosterone is secondarily stimulated by pituitary ACTH. Suppression of aldosterone release is secondarily controlled by high sodium concentrations, potassium deficiency, and the release of atrial natriuretic factor, a hormone released by the heart in response to increased blood volume (Digiovanna, 1994).

Aldosterone levels decrease with age. The primary reason for this decrease is thought to be a decline in renin activity and subsequent decline in the activity of the renin-angiotensin-aldosterone system. The release of aldosterone in response to ACTH does not appear to undergo age-related changes (University of California Academic Geriatric Resource Program, 2004). Because aldosterone stimulates sodium retention, decreased levels of aldosterone predispose older persons to sodium loss and possible hyponatremia, a condition characterized by water–mineral imbalance.

In addition to the overall decrease in aldosterone levels, older persons have an impaired ability to increase aldosterone secretion and aldosterone blood levels when necessary. Thus, there is a decline in aldosterone reserve capacity. This decline is not due to age-related changes in the adrenal cortex; rather, it is thought to be the

result of decreased ability of the kidneys to secrete renin when needed (Digiovanna, 1994).

Adrenal Sex Hormones. The primary adrenal sex hormone of interest among aging persons is **dehydroepiandrosterone (DHEA)**. DHEA is, in fact, the most abundant hormone in the human body (Shealy, 1995). The physiological function of DHEA is not well understood; however, it is known to convert to a multitude of other hormones, mainly the sex hormones testosterone and estrogen. The effects of DHEA are largely the result of the actions of those hormones to which it is converted (Dhatariya & Nair, 2003).

DHEA levels are high at birth but then undergo a precipitous drop until between the 6th and 10th year of life, at which time DHEA levels begin to steadily increase, achieving maximal concentrations during the third decade (Arlt, 2004). By age 70-80 years DHEA levels are only 5%–10% of peak values achieved in early adulthood (Hinson & Raven, 1999). Very low levels of DHEA are also observed in a variety of often age-related disease states including diabetes, cardiovascular disease, Alzheimer's disease, and various cancers. Thus, DHEA appears to be one of the most critical hormones in predicting disease. It has been hypothesized that low DHEA levels may be a marker of poor health status and, as a result, is associated with not only increased risk of disease, but also increased mortality (Arlt, 2004). As a result of DHEA's association with aging and disease, DHEA replacement has been touted as a means of slowing, if not reversing, the aging process as well as the chronic disease and disability with which it is often accompanied.

DHEA replacement studies in humans have produced equivocal results. For example, research has shown positive effects of DHEA replacement on muscle strength and body composition including increased muscle strength and decreased fat mass. Positive effects on bone, including increased bone mineral density, have also been demonstrated. However, numerous other studies have found no change in muscle strength, body composition, or bone density with DHEA replacement (Dhatariya & Nair, 2003). Overall, there is no consensus regarding the benefits of DHEA replacement. Although low levels of DHEA may predispose an individual to disease, there is no evidence that DHEA causes disease. In addition, most studies of DHEA replacement have been short term and, thus, there is a paucity of information regarding the benefits (or risks) of DHEA use over long periods of time (Hinson & Raven, 1999). DHEA is currently available without a prescription, but given the relative lack of information regarding the risks and benefits of its use, especially in the long term, caution should be taken in self-administration of the hormone without medical supervision.

Adrenal Medulla

The adrenal medulla is part of the sympathetic division of the autonomic nervous system. Hormones called **catecholamines**, mainly **epinephrine** (adrenaline) and **norepinephrine** (noradrenaline), are produced in the adrenal medulla and released in response to sympathetic nervous system activity. Much like cortisol, epinephrine and norepinephrine play a critical role in the body's stress response, and their release is greatly increased under stressful conditions. Major physiological effects mediated by epinephrine and norepinephrine hormones include increased heart rate and blood pressure, increased metabolic rate, and increased blood glucose levels and hence increased energy. There

is also an inhibition of nonessential activities such as gastrointestinal secretion. This preparing of the body to respond to stress or threat is often termed the "fight or flight" response. Activation of adrenal medullary hormones is stimulated through a variety of means including low blood sugar, hemorrhage, threat of bodily harm, emotional distress, and even exercise.

With aging there is a decrease in epinephrine secretion from the adrenal medulla. One study has reported that, under resting conditions, epinephrine secretion is 40% less in older as compared to younger men. However, there is a 20% simultaneous age-related decrease in epinephrine clearance from the circulation (Esler et al., 1995). As a result, levels of epinephrine concentration do not change significantly with age (Seals & Esler, 2000). Mechanisms for the age-related decline in epinephrine secretion have not been well investigated. Hypothesized mechanisms include 1) age-related attenuation in the adrenal medulla's response to nervous system activity, and 2) an overall age-associated decrease in nervous system activity to the adrenal medulla. It has also been hypothesized that reduced epinephrine secretion with age may be the result of decreased synthesis and storage of epinephrine in the adrenal medulla (Seals & Esler, 2000).

Under stressful conditions there is a characteristic increase in epinephrine secretion. This increase is markedly attenuated in older persons. Research has found that the increase in epinephrine secretion in response to a stressor is reduced by 33%–44% in older men as compared to their younger counterparts (Seals & Esler, 2000). Thus, the ability of the adrenal medulla to effectively respond to stressful situations is greatly impaired, even in healthy older adults.

Reproductive Hormones

Please refer to the previous discussion of the reproductive system for a review of age-related changes in the reproductive axis and female and male reproductive hormones.

The Pancreas

The hormone-secreting cells of the pancreas occur in tiny clusters known as the **islets of Langerhans**. Four islet cell types have been identified: the alpha (A), beta (B), delta (D), and pancreatic polypeptide (PP) cells. These cells secrete, respectively, **glucagon**, **insulin**, somatostatin, and pancreatic polypeptide. Of these hormones, only insulin is secreted exclusively by its cell type (B cells). The other hormones are also secreted by the gastrointestinal mucosa, and somatostatin can be found in the brain. The function of PP cells has not been well identified, and as such will not be discussed here.

Both insulin and glucagon are an integral part of metabolism regulation, and their secretion is regulated principally by blood glucose levels. High blood glucose levels stimulate the release of insulin and inhibit glucagon secretion. The released insulin then stimulates the cells of the body to absorb an amount of glucose from the blood that is sufficient to meet the body's energy needs. It also acts to promote storage of excess glucose in the liver, muscle, and fat cells and to suppress the release of this stored glucose. The result is a lowering of blood glucose levels. Conversely, low blood glucose levels stimulate glucagon release and inhibit insulin secretion. Secreted glucagon then promotes the release of stored glucose, and the result is a rise in blood glucose level. Somatostatin can inhibit the release of both insulin and

glucagon. Yet, the overall role of this hormone in regulation of blood glucose levels has not been firmly established.

Blood Glucose Levels

Blood glucose level is generally expressed as the amount (in milligrams) of glucose per deciliter (100 ml) of blood. According to the guidelines of the American Diabetes Association (ADA), normal fasting plasma glucose (FPG) level is below 100 mg/dl. When the FPG level lies between 100 and 125 mg/dl, an individual is said to have impaired fasting glucose, or impaired **glucose tolerance**, meaning that he or she is unable to reverse a dramatic rise in blood glucose levels and restore glucose homeostasis. An FPG of >126 mg/dl indicates a diagnosis of diabetes (American Diabetes Association, 2005).

In addition to the FPG, a person's ability to respond to increased blood glucose levels can also be measured by the oral glucose tolerance test (OGTT). The OGTT involves drinking a solution of concentrated glucose after having fasted for at least 10 hours. Blood glucose levels are measured at the beginning of the test and then periodically thereafter for 3 hours. Individuals with normal glucose tolerance will exhibit a rise in glucose levels following consumption of the glucose solution, but glucose levels will return to normal within 2 hours. In persons with impaired glucose tolerance, blood glucose levels will remain high for longer than 2 hours. According to ADA guidelines, a person whose blood glucose level is 140 mg/dl or less after 2 hours is considered to have a normal glucose response. A person whose blood glucose level falls to between 140 and 199 mg/dl after 2 hours is said to be glucose intolerant. When, after 2 hours, blood glucose levels are elevated to 200 mg/dl or above a person has diabetes (American Diabetes Association, 2005)

Age-Related Glucose Intolerance

First documented by Spence (1921) and since confirmed by numerous others, biological aging is associated with a decline in glucose tolerance. This decline is generally associated with impaired response to a glucose challenge such as the OGTT rather than with fasting glucose levels. Although a small rise in fasting glucose of 1–2 mg/dl per decade has been observed by some, it is postprandial (following a meal) glucose levels that show the greatest increase, up to 15 mg/dl per decade (Morrow & Halter, 1994). Thus, the glucose intolerance of aging is associated primarily with response to glucose challenge or oral glucose load (Jackson, 1990). Approximately 40% of individuals aged 65 to 74 years have some degree of impairment in glucose homeostasis. This percentage rises to 50% in those over the age of 80 years (Harris, 1990; Minaker, 1990). The altered glucose metabolism that comes with increased age has potentially important pathophysiological consequences, because these age-related changes have been associated with an accumulation of advanced glycosylation end products (AGEs) that are believed to contribute to varying age-related pathologies as well as long-term complications in those who have diabetes (Halter, 2000). Mechanisms proposed as contributing to age-related glucose intolerance include impaired insulin secretion, insulin resistance, and alterations in glucose counterregulation.

Insulin Secretion. Studies of the effects of aging on insulin secretion provide some evidence that aging may be associated with subtle impairment in insulin release (Chen, Halter, &

Porte). Other research, however, has found no alteration in insulin secretion with age (Peters & Davidson, 1997), and overall, results from various studies have provided equivocal results regarding the role of insulin secretion in the impaired glucose tolerance of aging. Although the inability to secrete sufficient amounts of insulin to overcome the heightened blood glucose levels and insulin resistance associated with aging may contribute to the phenomenon, impaired insulin secretion is generally not regarded as the primary cause of age-related glucose intolerance.

Insulin Resistance. A defect in insulin action is generally presented as the greatest contributing factor in impaired glucose tolerance among elderly persons. Evidence suggests that the primary effect of the aging process on glucose homeostasis is the development of a resistance to the actions of insulin, that is, **insulin resistance** (Peters & Davidson, 1997). This resistance leads to an impaired ability to suppress glucose release from the liver as well as an impaired glucose uptake, with the latter defect predominating. Skeletal muscle is considered the primary site of the impaired glucose uptake (Jackson, 1990). The mechanism(s) through which this impairment develops is still poorly understood. However, because insulin receptors on cell membranes appear to be unchanged with age (Fink, Kolterman, Griffin, & Olefsky, 1983; Rowe, Minaker, Pallotta, & Flier, 1983), the principal cause of resistance to insulin uptake is assumed to be a postreceptor defect. It is hypothesized this defect may involve the transportation of glucose from the membrane receptor into the cell. Glucose uptake in virtually all cells is mediated by transporter proteins. **GLUT4** is an insulin-mediated transporter located within vesicles in the cells' cytoplasm. Upon stimulation by insulin, these vesicles travel to the cell membrane and release the GLUT4 transporters, which in turn serve as a port of cell entry for glucose. In the absence of insulin stimulation, GLUT4 is transferred back to vesicles and the entry of glucose is slowed (Czech, Erwin, & Sleeman, 1996). Thus, GLUT4 plays a central role in the maintenance of glucose homeostasis, and it is hypothesized that impaired GLUT4 synthesis, transfer, and activity may lead to insulin resistance (Halter, 2000).

Glucose Counterregulation. Research has reported that glucose counterregulation by glucagon as well as other hormones—such as epinephrine, cortisol, and growth hormone—that tend to raise blood glucose levels is impaired in healthy elderly individuals (Marker, Cryer, & Clutter, 1992; Meneilly, Cheung, & Tuokko, 1994b). Rather than contributing to an elevation of plasma glucose levels, such a defect in glucose counterregulation results in delayed recovery from the hypoglycemic (low blood sugar) state. Thus, the impaired glucose homeostasis characterizing aging is marked not only by elevated fasting plasma glucose but also by periods of prolonged hypoglycemia. The latter gains even greater importance when it is recognized that in comparison to younger subjects, elders demonstrate reduced awareness of the autonomic warning signs of hypoglycemia (Meneilly, Cheung, & Tuokko, 1994a). Furthermore, they exhibit impaired psychomotor performance during hypoglycemic episodes and thus are less likely to take the action necessary to return glucose levels to normal even if they are aware of the existing hypoglycemia (Meneilly, 2001).

Confounding Factors of the Glucose Intolerance of Aging

A general consensus exists that the processes of biological and physiological aging are themselves the most important contributors to impaired glucose homeostasis among elders (Meneilly, 2001). However, other factors exist that may contribute to the severity of the impairment. These include genetic predisposition (Halter, 2000) as well as various lifestyle and environmental factors.

Adiposity. Aging is associated with a decrease in lean body mass (Peters & Davidson, 1997) and an overall increase in adiposity as well as a redistribution of adipose tissue to the intra-abdominal region (Kotz, Billington, & Leveine, 1999). This tissue redistribution places the elderly population at increased risk for development of insulin resistance and glucose intolerance because clinical studies have shown that persons with this adipose distribution pattern exhibit greater insulin resistance as well as increased risk of diabetes (Despres & Marette, 1999; Garg, 1999). Research shows that adipose tissue in the abdominal region is metabolically more active than that in other regions of the body due to elevated fatty acid concentrations in this area (Bjorntorp, 1997; Garg, 1999). It is hypothesized that this increased metabolic activity may be the cause of the increased insulin resistance associated with overweight and obesity (Despres & Marette, 1999). Indeed, it has been shown that older people who are classified as having normal glucose tolerance have less adiposity, particularly less intra-abdominal or central adiposity, and they do not experience a detectable difference in sensitivity to insulin (Halter, 2000).

Physical Activity. Physical activity is known to increase insulin action through heightened insulin sensitivity (Dela, Mikines, & Galbo, 1999; Jackson, 1990). Thus, decreased levels of physical activity may contribute to the development of insulin resistance. Aging is generally associated with declines in functional mobility and a decrease in physical activity, thereby placing elders at greater risk for impaired glucose tolerance. Older individuals with greater degrees of physical activity exhibit better glucose tolerance and less evidence of insulin resistance than do less active older people (Halter, 2000). It has been shown that glucose uptake is high in elderly athletes and low in bed-ridden elders compared with elderly controls (Dela et al., 1999). Furthermore, among elders endurance training has been shown to produce improvements in insulin-mediated glucose uptake similar to those observed in young subjects (Dela et al., 1999). It must be noted, however, that elders who are more physically active are also more likely to have less body fat and less central adiposity (Halter, 2000). Thus, it is most likely the combined effects of reduced abdominal adiposity and increased levels of physical activity that give rise to greater insulin sensitivity and glucose tolerance.

Diet. There is some evidence that impaired glucose tolerance in aging may be due at least in part to the diminished dietary carbohydrate intake often observed in elderly persons (Peters & Davidson, 1997). It has been shown that increased carbohydrate intake improves glucose tolerance in both young and old subjects. However, the older subjects exhibit decreased glucose tolerance at each level of matched carbohydrate intake when compared to the younger population (Chen et al., 1987). This idea is

supported by studies showing that when old and young subjects are fed diets comparable in carbohydrate levels, age differences in glucose tolerance, insulin secretion, and insulin action are diminished but still persistent (Halter, 2000). Thus, age itself appears to be correlated with decreased glucose tolerance. However, poor levels of dietary carbohydrate intake are likely to exacerbate the age-related impairments in glucose metabolism.

Polypharmacy. Several pharmacologic agents are known to affect glucose metabolism, and older adults are frequent users of such agents. Therefore, when evaluating alterations in blood glucose levels among elders, their medication regimens must be considered and attention must be paid to potential drug interactions (Minaker, 1990; Morley & Perry, 1991). Drugs known to affect glucose metabolism include, but are not limited to, β-blockers, calcium channel blockers, glucocorticoids, and other nonpharmacologic agents such as alcohol, caffeine, and nicotine (Bressler & DeFronzo, 1997). Furthermore, in treating the elderly diabetic patient, sulphonylureas should be used with caution. These pharmacologic agents stimulate insulin secretion and can contribute to the development of hypoglycemia (Graal & Wolffenbuttel, 1999). In addition, the interaction of sulphonylureas with some drugs can increase the hypoglycemic effect of the sulphonylureas (Peters & Davidson, 1997). Thus, elderly persons are at increased risk for the development of prolonged hypoglycemia when treated with sulphonylureas.

The Muscle

The body's muscular system is composed of three types of muscle—**skeletal muscle**, smooth muscle, and cardiac muscle. Skeletal muscles, examples of which include the bicep, tricep, quadricep, hamstring, and gastrocnemius (calf) muscle, make up the majority of the body's overall muscle mass. Skeletal muscle is also the muscle type in which most age-related changes occur. Thus, skeletal muscle and its changes with age will be the focus of our discussion about the aging muscle.

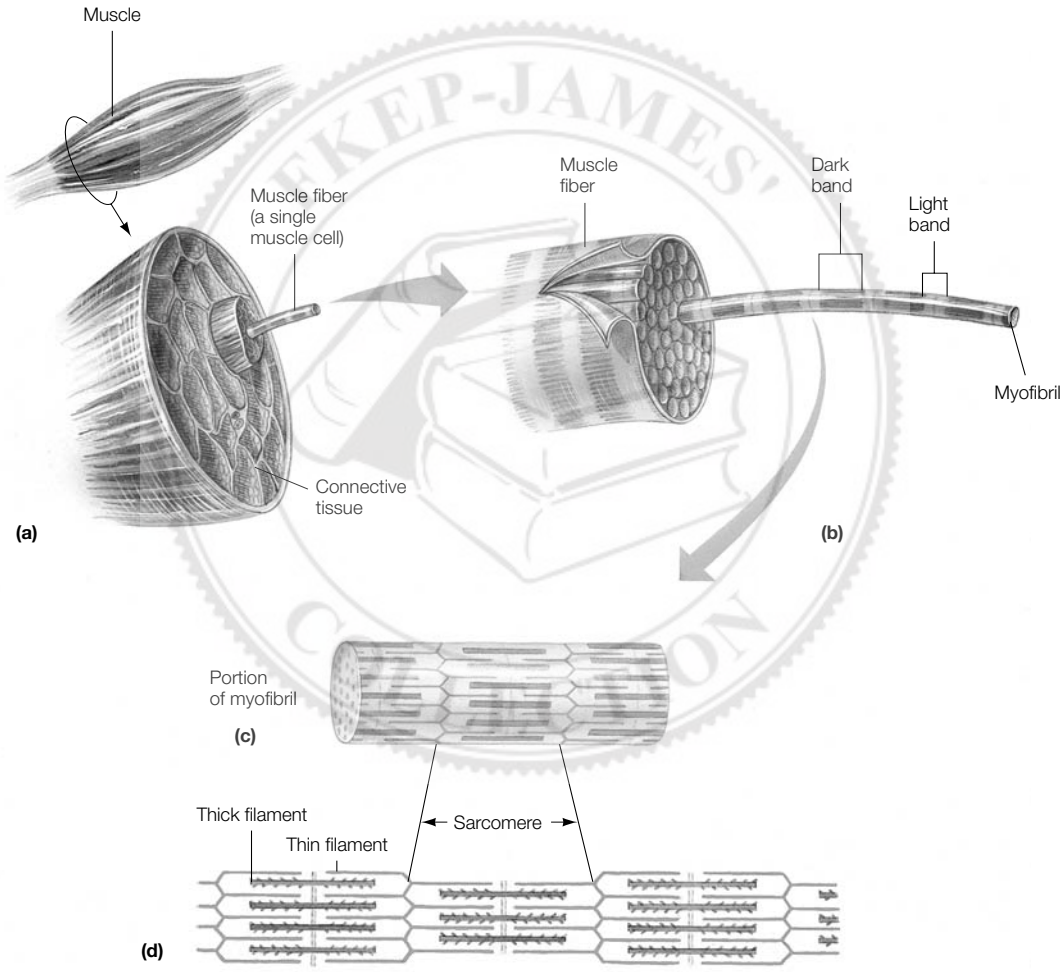
Skeletal Muscle: Structure and Function

Skeletal muscles are composed of several thin muscle bundles (**Figure 6-17**). These bundles are held together with connective tissue but are able to move independently of one another (Arking, 1998). The muscle bundles are composed of several muscle fibers, each of which is formed from the fusion of numerous individual **myofibrils**.

Myofibrils contain two types of protein molecules—**actins** and **myosins**. Actin and myosin molecules are arranged in a parallel, overlapping manner within compartments called **sarcomeres**. The overlap of actin and myosin within the sarcomere results in a pattern of alternating light and dark bands, which accounts for the striated, or striped, appearance of skeletal muscle. In a state of rest, actin molecules overlap both ends of the myosin molecules, which are centered within the sarcomere. Muscle contraction results when actin molecules are pulled toward the center of the sarcomere in a ratcheting motion (**Figure 6-18**). This contraction of skeletal muscle is controlled by an individual's own volition; hence, skeletal muscle has also been termed voluntary muscle.

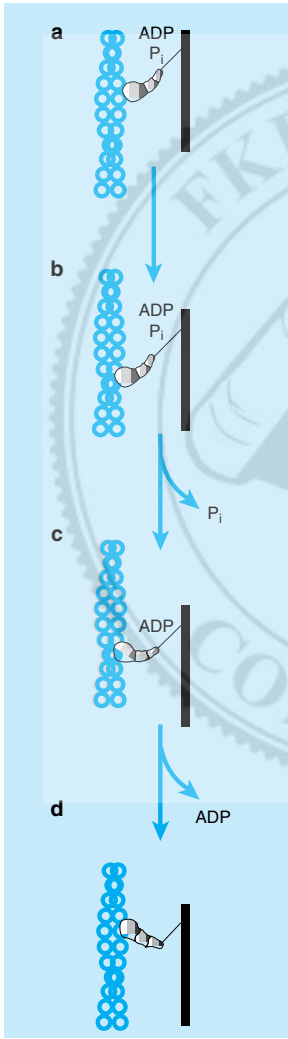
Although muscle fibers have a common basic structure, they can be divided into two distinct physiological types, **fast-twitch** and **slow-twitch**

Figure 6-17 Structure of the skeletal muscle fiber, myofibril, and sarcomere. *(a) A single muscle fiber teased out of the muscle. (b) Each muscle fiber consists of many myofibrils. (c) Note the banded pattern of the myofibril. (d) Sarcomeres consist of thick (myosin) and thin (actin) filaments, as shown here.*



Source: Daniel D. Chiras, *Human biology* (5th ed.). Sudbury, MA: Jones and Bartlett Publishers, 2005.

Figure 6-18 The interaction of actin and myosin to produce skeletal muscle contraction. Inorganic phosphate (P_i) and ADP may be released during the contraction.



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fibers. These two fiber types produce the same amount of force per contraction; however, they produce this force at different rates. White fast-twitch fibers contract quickly and provide short bursts of energy, but they fatigue quickly. As a result of these contractile properties, fast-twitch fibers are generally used for high-intensity, low-endurance, generally anaerobic activities such as sprinting and weight lifting. Red slow-twitch fibers contract slowly but steadily and are not easily fatigued. Therefore, these fibers are best suited for use in aerobic activities of low intensity but high endurance, such as long-distance running. Slow-twitch fibers are also used for postural activities, such as the supporting of the head by the neck. Every person is born with a fixed ratio of fast-twitch to slow-twitch muscle fibers. However, the ratio may vary from one body location to another, and one person may have a greater ratio of fast-twitch to slow-twitch fibers in a particular location than does another person. This phenomenon is part of what can result in one individual being, for example, a better sprinter or better long-distance runner than another.

Aging of the Skeletal Muscle

SARCOPENIA

A reduction in muscle mass occurs to at least some degree in all elderly persons as compared to young, healthy, physically active young adults (Roubenoff, 2001). This reduction in muscle mass is known as **sarcopenia** (from the Greek meaning poverty of flesh), and is distinct from muscle loss due to disease or starvation. One population-based study estimated that the prevalence of sarcopenia rises from 13%–24% in individuals under the age of 70 years to greater than 50% in persons over the age of 80 years (Baumgartner et al., 1998). Sarcopenia is

of great consequence to older persons because it is associated with tremendous increases in functional disability and frailty. Older sarcopenic men are reported to have 4.1 times higher rates and women 3.6 times higher rates of disability than their gender-specific counterparts with normal muscle mass (Baumgartner et al., 1998).

The total cross-sectional area of skeletal muscle is reported to decrease by as much as 40% between the ages of 20 and 60 years (Doherty, 2003), with the greatest loss occurring in the lower limbs (Doherty, 2003; Vandervoot & Symons, 2001). Men are known to have greater total muscle mass than women; however, men experience greater relative muscle loss with age than do their female counterparts (Janssen, Heymsfield, Wang, & Ross, 2000). The reason for this gender difference has not been clearly defined, but it is postulated to relate to hormonal factors (Janssen et al., 2000). Although men experience greater relative muscle loss, it has been noted that sarcopenia may be of greater concern for older women given their longer life expectancy and higher rates of disability in old age (Roubenoff & Hughes, 2000). Gender is not the only factor contributing to differences in the rate of sarcopenia. The loss of muscle mass is highly individualized and greatly dependent upon genetic, lifestyle, and other factors that influence the varied mechanisms proposed to underlie sarcopenia. The most commonly proposed mechanisms include a decline in the number and size of muscle fibers, loss of motor units (described below), hormonal influences, altered protein synthesis, nutritional factors, and lack of physical activity.

Changes in Muscle Fibers. With age, there is an overall loss in the number of both fast- and slow-twitch muscle fibers. By the ninth decade, approximately 50% fewer muscle fibers are present in the vastus lateralis muscle (the lateral portion of the quadriceps) than are observed in the same muscle of a 20 year old (Lexell, Taylor, & Sjostrom, 1988). In addition, a reduction in the size of muscle fibers has been observed, with the greatest reduction seen in fast-twitch muscle fibers. Reduction in the size of fast-twitch fibers ranges from 20% to 50% with age, whereas slow-twitch fibers have been shown to reduce in size by only 1% to 25% as a person ages (Doherty, 2003).

Loss of Motor Units. Muscle fibers are innervated by motor nerves, which extend from the spinal cord. Each nerve innervates several muscle fibers. The combination of a single nerve and all the fibers it innervates is known as a **motor unit**, and it is this motor unit that allows muscles to contract. Beginning about the seventh decade of an individual's life, the number of functional motor units begins to decline precipitously (Vandervoot & Symons, 2001). One group of researchers found that the estimated number of motor units in the bicep-brachialis muscle declined by nearly half, from an average of 911 motor units in subjects less than 60 years of age to 479 in subjects older than 60 years of age (Brown, Strong, & Snow, 1988). A similar degree of motor unit loss was shown in a group of subjects ages 60 to 80 years compared with a group of subjects ages 20 to 40 years (Doherty & Brown, 1993).

The loss of motor units with age is due to an age-related loss of muscle innervation (Deschenes, 2004). As motor units are lost, surviving motor nerves adopt muscle fibers that have been abandoned due to their loss of innervation (Roubenoff, 2001). This results in an increase in the size of the adopting motor unit. Thus, older persons generally have larger, yet less efficient, motor units than do younger persons (Roubenoff, 2001). Because

these enlarged motor units are now responsible for the contraction of a greater number of muscles, they are generally less efficient. This inefficiency can lead to tremors and weakness (Enoka, 1997) and, together with the atrophy of fast-twitch muscle fibers, can result in a decline in coordinated muscle action (Morley, Baumgartner, Roubenoff, Mayer, & Nair, 2001). Furthermore, abandoned muscle fibers that are not adopted by surviving motor units begin to atrophy as a result of disuse secondary to their loss of innervation. This atrophy contributes to an overall loss of muscle mass. Muscle atrophy secondary to nerve cell death is clearly demonstrated through the loss of muscle mass observed in persons who have suffered a stroke (Roubenoff, 2001).

Hormonal Influences. Estrogen and testosterone are anabolic hormones—hormones that promote the build-up of muscle. With age, levels of these hormones decline, thereby contributing to muscle atrophy and sarcopenia. Accelerated loss of muscle around the time of menopause lends support to the idea that estrogen may play a role in the maintenance of muscle mass (Poehlman, Toth, & Gardner, 1995). There is evidence supporting estrogen replacement therapy as a means of attenuating the loss of muscle mass among older women (Dionne, Kinaman, & Poehlman, 2000; Phillips, Rook, Siddle, Bruce, & Woledge,1993). However, some research suggests that the beneficial effects of estrogen replacement are most pronounced in the perimenopausal period and may have little to no effect on the loss of muscle mass among postmenopausal women (Doherty, 2003). Among older men, testosterone supplementation has been shown to increase muscle mass; however, studies performed to date have been conducted among healthy older men. It is not known whether testosterone supplementation would have the same beneficial effects on muscle mass in older men with physical impairments, chronic disease, or frailty (Bhasin, 2003). Testosterone has also been shown to increase muscle strength among elderly women (Davis, McCloud, Strauss, & Burger, 1995).

Growth hormone (GH) (see "The Endocrine System" earlier in this chapter) is another anabolic hormone that declines with age. The decline in GH begins during the fourth decade of life and parallels the decline in muscle mass (Roubenoff, 2001). Because of the strong association between GH and muscle mass, administration of GH has been suggested as a potential method by which age-related loss of muscle mass might be attenuated. However, research investigating the effects of GH on muscle mass has produced equivocal results, and there is no evidence that GH administration results in any increase in muscle strength (Borst, 2004). In addition, the use of GH is accompanied by numerous side effects including fluid retention, hypotension, and carpal tunnel syndrome, and these side effects are reported to be more severe among older persons (Borst, 2004). Given the equivocal results regarding its efficacy as well as the side effects associated with its use, GH is not recommended as an intervention for sarcopenia (Doherty, 2003).

Protein Synthesis. After exclusion of water, protein is the primary component of skeletal muscle and accounts for approximately 20% of its weight (Proctor, Balagopal, & Nair, 1998). Furthermore, muscle is the body's largest repository for protein Balagopal et al., 1997; Proctor et al., 1998). When protein breakdown within the body exceeds protein synthesis, muscle atrophy occurs. Some research findings suggest that aging is associated with a reduced capacity of skeletal muscle to synthesize protein. Such a

reduction is likely to lead to a decrease in muscle mass among elderly persons. However, other research (Volpi, Sheffield-Moore, Rasmussen, & Wolfe, 2001) has found no difference in the synthesis rate of muscle protein with age. Thus, further studies are needed to elucidate the role that protein synthesis plays in sarcopenia.

Nutritional Factors. Food intake declines with age, with greater decline occurring among men than women (Morley et al., 2001). This decline is often referred to as the **anorexia of aging**, and is hypothesized to be associated with a decrease in the senses of smell and taste as well as an earlier rate of satiation with age (Morley et al., 2001). It is thought that the anorexia of aging may result in protein intake below the level necessary to maintain muscle mass and consequently contribute to sarcopenia (Morley et al., 2001). However, the degree to which alterations in protein intake with age may play a role in age-related loss of muscle mass is unknown and requires further study.

Muscle Strength

Loss of **muscle strength**, the muscle's capacity to generate force, is thought to be secondary to declines in muscle mass (Ivey et al., 2000), and decreases in muscle strength are seen with advancing age. Data from one study demonstrated that 71% of men between the ages of 40 and 59 and 85% of men age 60 or older had declines in muscle strength over a 9-year period (Kallman, Plato, & Tobin, 1990). Age-related decreases in strength are reported to range from 20%–40%, with even greater decreases of 50% or more occurring in persons in their ninth decade or beyond (Doherty, 2003). Older men experience greater absolute declines in muscle strength than women; however, because men have greater total muscle mass than women, relative losses in strength are similar between males and females (Doherty, 2003). The rate at which the decline in muscle strength occurs has not been well defined, but longitudinal studies have shown rates of strength loss of about 1%–3% per year (Doherty, 2003).

Muscle Quality

In addition to declines in muscle mass and strength, advancing age is also associated with a loss of **muscle quality**, strength generated per unit of muscle mass. However, research shows that age-related declines in muscle quality differ by both gender and muscle group. A study (Lynch et al., 1999) of arm and leg muscle quality in men and women found that age-related differences in arm muscle quality declined more among males than females, yet leg muscle quality declined at similar rates among both genders. In addition, among men the rates of decline of leg and arm muscle quality were similar. However, among women there was a greater rate of decline of leg muscle quality than arm muscle quality. Thus, age-related decline in muscle quality is highly variable, and studies examining this decline should be vigilant to include various muscle groups as well as subjects of both genders.

Resistance Training and Aging Muscle

Older persons who are less physically active have less muscle mass and greater rates of disability than persons who remain physically active as they age (Evans, 2002). There is a large body of evidence demonstrating that exercise cannot only slow or prevent muscle loss with age, but also increase muscle mass as well as muscle strength among older persons. Resistance exercise, exercise aimed at increasing the force

generated by muscle, has been shown to have the most beneficial effects on aging muscle. One study (Frontera, Meredith, O'Reilly, Knuttgen, & Evans, 1988) of 66-year-old men found that a 12-week program of resistance training resulted in significant increases in the cross-sectional area of both fast-twitch and slow-twitch muscle fibers. In addition, muscle strength improved significantly. Even among very elderly persons, resistance exercise has shown benefits for age-related changes in muscle. An 8-week resistance training program conducted among men and women in their 90s resulted in a 15% increase in muscle cross-sectional area and a nearly 175% increase in the amount of weight subjects were capable of lifting (Fiatarone et al., 1990). Numerous other studies have shown that resistance training programs of 10 to 12 weeks duration, with training 2–3 days per week, result in significant increases in muscle strength among older persons (Doherty, 2003). It has been reported that resistance training may restore approximately 75% of lost muscle mass and 40% of lost muscle strength (Roubenoff, 2003).

Resistance training has also been shown to improve muscle quality. Following a 9-week training program, older men and women showed statistically significant increases in muscle quality. Furthermore, subsequent to the initial 9-week program there was a 31-week detraining period after which levels of muscle quality remained significantly greater than levels measured before the start of the 9-week program (Ivey et al., 2000).

Finally, there is also evidence to support an increase in protein synthesis with resistance exercise. One study reported an approximately 50% increase in protein synthesis among 65- to 75-year-old men following a 16-week progressive resistance training program (Yarasheski, Zackwieja, Campbell, & Bier, 1995). Improvements in protein synthesis have also been demonstrated among frail elderly men and women ages 76–92 years (Yarasheski et al., 1999). Other research has reported increases in protein synthesis of over 100% following resistance training (Hasten, Pak-Loduca, Obert, & Yarasheski, 2000).

The plethora of benefits to muscle that result from resistance training demonstrate the extreme importance of regular physical activity, especially of the resistance type, among aging men and women. It is no wonder that many have cited resistance training as the most important factor in preventing and even reversing the losses in muscle mass, strength, and power that come with advancing age.

The Skeletal System

The skeletal system is composed of the 206 bones of the body as well as the joints that connect them. The skeleton, extremely strong yet relatively light in weight, gives shape and support to the human body. It also acts to protect the body; for example, the skull protects the brain and eyes while the ribs protect the heart and the vertebrae protect the spinal cord. The skeleton also provides a structure to which muscles can attach by tendons, enabling the body to move. Furthermore, it acts as a set of levers to modify movement provided by the muscles, increasing or decreasing the distance, speed, and force obtained from muscle contraction (Digiovanna, 1994). When one considers the importance of the functions performed by the skeletal system, it becomes apparent that any alteration or destruction of the skeletal system would have potentially serious consequences for the overall health and physical functioning of the human body.

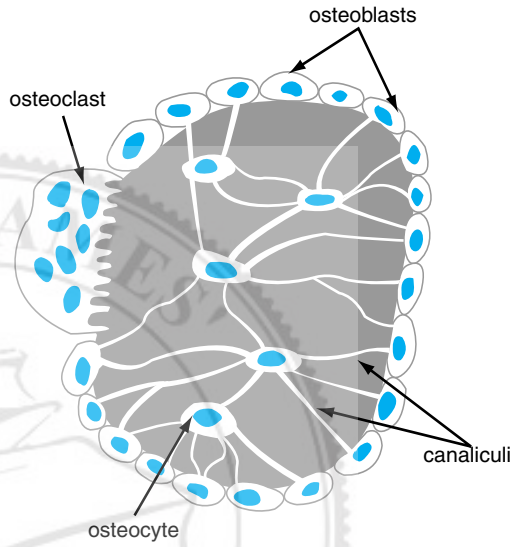
Bone

In addition to the aforementioned functions of the skeletal system, each component of bone has its own unique function(s). A principal function of bone is mineral storage and the maintenance of free mineral homeostasis. The predominant mineral stored within bone is calcium. Calcium is necessary for, among other things, muscle contraction and nerve impulse conduction. If it is to aid in these functions, calcium must be readily and continuously available in a free form. Yet too much free calcium may be toxic and too little calcium may impair or prevent cell functioning. Thus, there must be a means of maintaining mineral homeostasis. Bone cells assist in this maintenance.

Bone cells are of three types—**osteoblasts**, **osteocytes**, and **osteoclasts** (**Figure 6-19**). Osteoblasts secrete collagen and minerals to produce a bone matrix; hence, it is these cells that are responsible for the construction of new bone and the repair of damaged or broken bone. In time, some osteoblasts become embedded in the bone matrix they produce. They then become dormant and are termed osteocytes. The third bone cell type is the osteoclast, which break down or resorb existing bone, dissolving minerals of the bone matrix so that these minerals can be used by the body.

The formation and resorption of bone are not separately regulated processes. Osteoblasts and osteoclasts occur together in temporary anatomic structures known as **basic multicellular units (BMUs)**. A mature BMU is composed of both cell types, a vascular supply, a nerve supply, and connective tissue (Manolagas, 2000). A BMU has a lifespan of approximately 6–9 months, longer than the lifespan of osteoblasts and osteoclasts. Thus, the BMU must be continually supplied with new cells.

Figure 6-19 Cross-section through a bony trabecula.



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During development and growth, BMUs mold bone to achieve proper size and shape by osteoclastic removal of bone from one site and osteoblastic deposition at a different one. This process is known as modeling. By adulthood, the skeleton has reached maturity and modeling no longer occurs. However, in adulthood there is periodic replacement of old bone with new bone, and this process is known as bone remodeling. Through bone remodeling, the human skeleton is completely regenerated every 10 years (Manolagas, 2000). The purpose of bone remodeling is not well understood; however, it is hypothesized that remodeling occurs to repair fatigue and damage and to prevent excessive

aging. Thus, the primary purpose of bone remodeling may be to attenuate if not prevent the accumulation of old bone (Manolagas, 2000).

Bone remodeling by the osteoblasts and osteoclasts is principally controlled through hormonal regulation. As previously noted in the discussion of the endocrine system, thyroid calcitonin inhibits bone resorption, lowering blood calcium levels. Parathyroid hormone from the parathyroid gland has the opposite effect—it increases bone resorption and mobilizes calcium, thereby increasing blood calcium levels. Other hormones are also involved in bone remodeling, yet often indirectly. Glucocorticoids promote bone resorption, and growth hormone and insulin work to increase bone formation.

Bone Types

There are two types of bone—cortical or compact bone and trabecular or spongy bone. **Cortical bone** comprises the outer layer of bone and is composed of numerous osteons—long, narrow cylinders of bone matrix. The osteons are tightly fused to one another and possess a complex system of blood vessels and nerves. Osteons are continually dissolved and replaced anew. Cortical bone surrounds and protects **trabecular bone** and provides the majority of skeletal strength.

Trabecular bone makes up the inner portion of bone and is composed of small pieces of bone matrix known as trabeculae. The trabeculae are arranged in very irregular patterns. Compared to cortical bone, trabecular bone provides only minimal skeletal strength. The ratio of cortical bone to trabecular bone varies throughout the body. Cortical bone is predominant in the limbs whereas trabecular bone is predominant in bones of the axial skeleton, such as the ribs, vertebrae, and skull.

Aging of the Bone

Bone Loss

In order to ensure that there is no net loss of bone, the amount of bone resorbed by the BMU must exceed the amount formed. As the body ages, it loses the ability to maintain this balance between bone resorption and formation. The BMU is said to be in a negative balance and bone loss occurs. Negative BMU balance begins as early as the third decade, long before menopause in women (Seeman, 2003a). After several decades have passed, skeletal mass may be reduced to half of what it was at 30 years of age (P. S. Timiras, 2003b).

The osteoclast lifespan is increased by estrogen deficiency whereas the lifespan of osteoblasts declines with such a deficiency. Consequently, BMU balance becomes more negative. Thus, estrogen deficiency is a key contributor to bone loss, and bone loss accelerates in women after menopause due to a decline in estrogen levels (Seeman, 2003a). Simultaneously, as osteoclast activity increases and more bone is resorbed, the remaining bone becomes more porous. The result of this increased porosity is a decline in bone mineral density. Unfortunately, bone loss continues from the lower density bone and at a higher rate than before menopause. The increased rapidity of bone loss is explained by 1) the increasingly negative BMU, 2) a higher remodeling rate, and 3) reduction in the mineral content of bone due to the replacement of older, more densely mineralized bone with younger, less densely mineralized bone (Seeman, 2003b).

Estrogen deficiency also plays a role in bone loss among men. Although men do not undergo the midlife acceleration in bone remodeling characteristically seen in women, decreased bone

mineral density among men is due to a decline in levels of estrogen, not testosterone (Seeman, 2003a). It has been suggested that estrogen may regulate bone resorption whereas both estrogen and testosterone may regulate bone formation (Falahati-Nini et al., 2000). At any given age bone mass is greater in men than in women, but the rate of bone loss is generally accelerated among women (Arking, 1998). However, the overall loss of bone is quantitatively similar in persons of both genders, suggesting that bone loss may occur over a longer period of time in men than in women (Seeman, 2003b).

Bone Type

The majority of bone remodeling occurs within trabecular bone, and in both men and women bone loss occurs at least a decade earlier in trabecular bone than in cortical bone (Arking, 1998). As the body ages, trabeculae become thinner and weaker. In addition, some may disappear entirely and cannot be replaced. As a result of these changes the bone becomes permanently weaker at the site of trabeculae thinning or loss. Furthermore, some trabeculae may become disconnected from the others, resulting in a decline in bone strength (Digiovanna, 1994).

Corticol bone loss is not detected until about 40 years of age, at which time the rate of loss begins to increase. However, the loss of cortical bone still occurs at only half the rate of trabecular bone loss (Digiovanna, 1994). Loss of trabecular bone occurs from the inside of the bone outward. Normally, old osteons shrink and are dissolved while new osteons form next to them and eventually fill the space left by the old ones. With age, however, new osteons are unable to fill this space completely, leaving larger and larger gaps between existing osteons. The result is a weakening of the bone.

Bone Strength

With age there is not only a loss of bone, but also a loss of bone strength. This loss of strength has been attributed to at least two different processes. The first is the increased porosity of bone that occurs due to continuous bone remodeling. Greater porosity reduces the structural strength of bone. The second is an age-related increase in bone mineralization leading to increased brittleness of bone (Arking, 1998). In childhood approximately two thirds of bone is composed of collagen and connective tissues whereas in aged individuals minerals comprise two thirds of bone structure (P. S. Timiras, 2003b). Bone strength is a property that allows bone to withstand forces applied to the skeleton during movements such as bending and stretching. Strong, young bones will respond to force with flexibility and resilience, bending as needed. But aged bones are more likely to snap when subjected to force. Consequently, the age-associated decline in bone strength increases older persons' risk of bone fracture (Arking, 1998). See below for further discussion of bone fractures among older persons.

Age-Related Disease and Injury of the Bone

Osteoporosis

Osteoporosis is a disease that results from reductions in bone quantity and strength that are greater than the usual age-related reductions. Bones of those with osteoporosis are generally very porous, containing numerous holes or empty pockets. In addition, they are thin and fragile and, consequently, extremely prone to

fracture (discussed below). An estimated 10 million Americans suffer from osteoporosis and another 34 million have low bone mass that puts them at increased risk for the disease. The majority of osteoporosis cases, 8 million (80%), occur in women whereas only 2 million (20%) occur in men (National Osteoporosis Foundation, 2004).

Bone Fracture

Osteoporosis and the general progressive loss of bone mass with age leads to increased risk of fracture among older persons. Fifty percent of women and 25% of men over the age of 50 years will experience an osteoporosis-related fracture in their lifetime. Fractures in elderly persons often occur as the result of only minimal or moderate trauma whereas in younger persons considerable force is required to fracture a bone. In addition, the fractures that occur in old age generally occur at different sites than those that occur at younger ages. Among younger persons the most common site of fracture is the bone shaft, yet in older persons fractures generally occur next to a joint (P. S. Timiras, 2003b). Regardless of the site of fracture, fractures among older adults are generally more difficult to prevent or repair, and recovery from fracture occurs much more slowly in older persons than in young individuals.

In young adults fractures occur more frequently among males than females. This is hypothesized to be the result of males' generally more frequent engagement in physical activity and exposure to accidental falls (P. S. Timiras, 2003b). In older adults, however, women generally experience greater fracture rates than men. This gender difference may be due, at least in part, to the fact that women begin life with a smaller skeleton that adapts less well to aging than that of men (Seeman, 2002). This gender difference in fracture incidence with age is most evident in fractures of the vertebrae, forearm, and hip (P. S. Timiras, 2003b).

There are also racial differences in the rate of fracture. The rates of fracture associated with old age are significantly lower among African Americans than Caucasians, specifically three times lower among African American women and five times lower among African American men. These racial differences may be explained by the 10% to 20% greater bone mass and density of adult bone among African Americans. In addition, bone remodeling occurs more slowly among African Americans than Caucasians (P. S. Timiras, 2003b).

Joints

Joints or articulations are junctions between two or more bones. Three types of joints comprise the body's articular system. **Immovable joints** or fibrous joints consist of collagen fibers that bind bones tightly together. The toughness of collagen allows minimal, if any, shifting of bones, and as such the joints are immovable. Skull bones are examples of immovable joints. These joints keep the skull in place, allowing support and protection of the brain.

Cartilaginous joints are joints in which a layer of cartilage separates the two connected bones. These joints may also have ligaments to aid in holding bones together. Cartilaginous joints allow for slight movement. Examples of this type of joint include the joints between vertebrae. These cartilaginous joints are known as intervertebral disks, and together with strong ligaments they hold the vertebrae together and aid the vertebrae in supporting the weight of the body. They also allow the vertebral column to bend and twist slightly.

The third and most common type of joint is the **synovial joint**. The bones that this type of

joint connects contain smooth cartilage on their opposing ends. This cartilage minimizes friction when the joint moves. A sleeve of connective tissue encapsulates the ends of the two bones that have been joined. The joint capsule is lined with the **synovium**, a membrane that secretes **synovial fluid**. The fluid is thick and slippery, allowing easy movements of the bones. In addition, it absorbs part of the shock sustained by the joint. Although synovial joints, together with reinforcing ligaments, bind two bones tightly together, they are characterized by free range of motion. Nearly all the joints in the arms, legs, shoulders, and hips are synovial joints.

Aging of the Joints

Immovable Joints

With increasing age the collagen between the bones of immovable joints becomes coated with bone matrix. As a result, the space between bones gets even narrower and the bones may eventually fuse together completely. Consequently, the joints become stronger. Therefore, with age immovable joints actually improve.

Cartilaginous Joints

The aging process is associated with a stiffening of the cartilage comprising cartilaginous joints. Ligaments also become stiffer and less elastic. The result of these changes is a reduction in the amount of movement allowed by the cartilaginous joints. Vertebral movement is decreased and there is a decline in the ability of intervertebral disks to support the body and cushion the spinal cord. With age the vertebrae weaken and, as a result, the weight of the body forces the intervertebral disk to expand into the vertebrae, forming a concave region. This change appears to force more of the weight of the body onto the outer edge of the intervertebral disk, compressing the disk (Digiovanna, 1994). The result is a shortening of the spinal column and a decrease in body height.

Synovial Joints

The functional ability of synovial joints begins to decline around 20 years of age (Digiovanna, 1994). As a person ages both the joint capsule and the ligaments become shorter, stiffer, and less able to stretch. In addition, the cartilage lining the bones becomes calcified, thinner, and less resilient (Arking, 1998). Consequently, it becomes more difficult to move, and range of motion and efficiency of the joint are reduced. As a result, both the initiation and speed of movement begin to slow with age. This leads to a lessened ability to maintain balance and makes it difficult to act quickly to minimize the force of impact resulting from a fall or other physically harmful event.

With age the synovial membrane also becomes stiffer and less elastic. In addition, it loses some of its vasculature, which in turn reduces its ability to produce synovial fluid. The fluid that is produced is thinner and less viscous (Arking, 1998). As a result of these changes in the synovial membrane and fluid, there is a decline in the ease and comfort with which the joints move within the joint capsule as a person ages.

The net result of the aging of synovial joints is often increased injury and decreased activity performance. However, there is evidence to demonstrate that this net result can be slowed or minimized through continual physical activity. Exercise can increase flexibility of the joint components and also appears to increase circulation to the joints (Digiovanna, 1994).

It should be noted here that at least some, if not many, of the changes in joints with age may be due not to the aging process but to repeated

injuries the joints experience over time due to the performance of regular daily activities. It is often difficult to distinguish these latter effects from true biological aging (Digiovanna, 1994).

Disease of the Joints

Osteoarthritis

Age-related changes in the joints often result in or are compounded by arthritis, a disease characterized by inflammation of the joints and accompanied by joint pain and injury. There are more than 100 different types of arthritis, but the two most common forms are osteoarthritis and rheumatoid arthritis.

Osteoarthritis is by far the most common form of arthritis, accounting for more than half of all arthritis cases (Digiovanna, 1994). More than 20 million people in the United States have osteoarthritis, and the disease is much more common among older persons. More than half of people 65 years of age or older would show x-ray evidence of osteoarthritis in at least one joint. Before age 45, osteoarthritis is more common among men, but after age 45 it becomes more common in women (National Institute of Arthrtis and Musculoskeletal and Skin Diseases, 2002).

Osteoarthritis frequently affects the weight-bearing joints, such as the hips, knees, and lower spine. Finger joints also are common sites of osteoarthritis. This form of arthritis causes a breakdown and weakening of cartilage, which results in a decreased ability to cushion the ends of the bones. If enough cartilage is lost, the bones will begin to rub against each other. The bones then respond by producing more bone matrix, which builds up and can lead to an enlargement of the joints and difficulty in joint movement. In addition, the bone matrix produced may be rough and jagged and, when it rubs against soft tissues, can cause pain. Furthermore, with age there is a decrease in synovial fluid concentration and viscosity. This decrease may lower the lubricating and cushioning properties of the joints, making movement of the joint difficult and painful (Moskowitz, Kelly, & Lewallen, 2004).

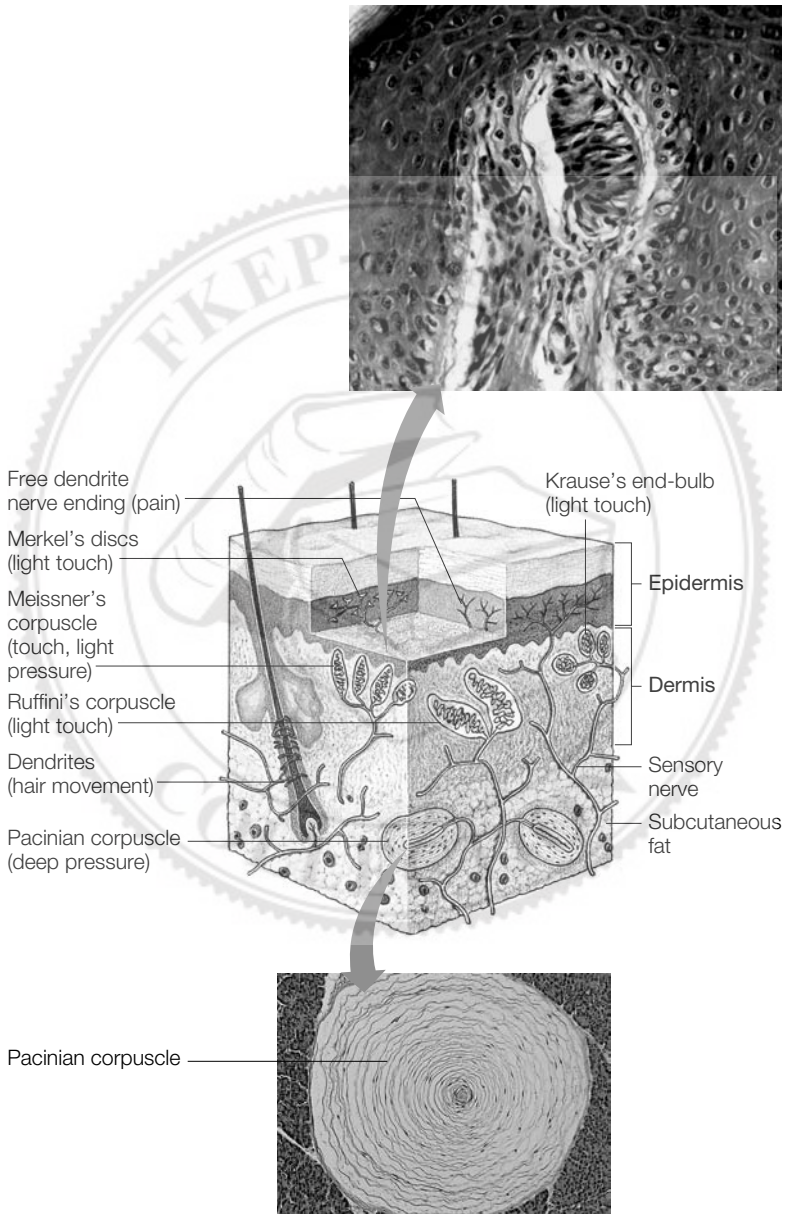
The Sensory System

The sensory system provides constant stimulation to the body and relays important messages to the mind and body. The sensory system may be viewed as a system that can evoke emotion and memories, and when disrupted can influence quality of life (Arking, 1998; Digiovanna, 1994; Weiffenbach, 1991). Age-related changes to touch, smell, taste, vision, and hearing lead older individuals to interact with the environment differently than they did at a younger age.

Touch

The ability to touch and distinguish texture and sensation tends to decline with age due to a decrease in the number and alteration in the structural integrity of touch receptors, or Meissner's corpuscles, and the pressure receptors, or the Pacinian corpuscles (Arking, 1998; Digiovanna, 1994, 2000). Receptors that are related to the sense of touch are also known as **mechanoreceptors**. See **Figure 6-20** for an illustration and location of mechanoreceptors in the integumentary system. Changes to these touch and pressure receptors lead to a decrease in the ability to acknowledge that an object is touching or applying pressure to the skin; a decrease in the ability to identify where the touch or pressure is occurring; an inability to distinguish between how many objects are touching the skin; and a decreased ability to identify objects just by touch (Digiovanna, 1994, 2000). Aging changes to the

Figure 6-20 General sense receptors.



Source: Daniel D. Chiras, *Human biology* (5th ed.). Sudbury, MA: Jones and Bartlett Publishers, 2005; (Top photo) © Astrid & Hans-Frieder Michler/Photo Researchers, Inc. (Bottom photo) © Cabisco/Visuals Unlimited.

skin as well as changes in surface hair may also play a role in diminished touch. (See the following section, "The Integumentary System.") Arking (1998) suggests that the skin on the hands, the most sensitive to touch, undergoes the most age-related change in touch. In addition to the hands, Stevens and Choo (1996) found that the feet undergo major declines in touch sensitivity with age. This conclusion may be explained by a higher concentration of receptors in the hands and feet whereas the rest of the body has a larger surface area over which receptors are dispersed. Stevens and Patterson (1995) conducted a spatial acuity study of touch that involved changes in stimuli related to discontinuity, skin location, and area on the skin as well as changes in the orientation of stimuli in older versus younger adults. Conclusions from this study showed that all four acuity measures declined with age at a rate of 1% per year between the ages of 20 and 80. Furthermore, these researchers demonstrated that acuity at sites such as the forearm and lip declined less quickly than acuity in the fingertips. These changes to touch can be related to a decline in the number of sensory neurons and a decreased ability of the remaining sensory neurons to efficiently relay signals critical to the detection, location, and identification of touch or pressure on the skin (Digiovanna, 1994, 2000).

Smell

Olfactory System Anatomy

The chemical senses of smell and taste work together and influence each other as a functional entity (Weiffenbach, 1991). The olfactory system contains supporting cells for mucous production, olfactory receptors, and basal cells that replenish every 2 months and eventually transform into new olfactory receptors and the actual olfactory receptors (Sherwood, 1997). When basal cells transform into receptors the entire neuron, including the axon that projects into the brain, is completely replaced (Sherwood, 1997). The olfactory axons connect to the olfactory bulb and the olfactory nerve layer. The nerve layer synapses into the glomerulus, sending messages to the primary olfactory cortex of the brain (Kovacs, 2004). Approximately 5 million olfactory receptors of about 1,000 different types are located in the nose. Each receptor type detects one miniscule component of an odor instead of the odor as a whole (Sherwood, 1997).

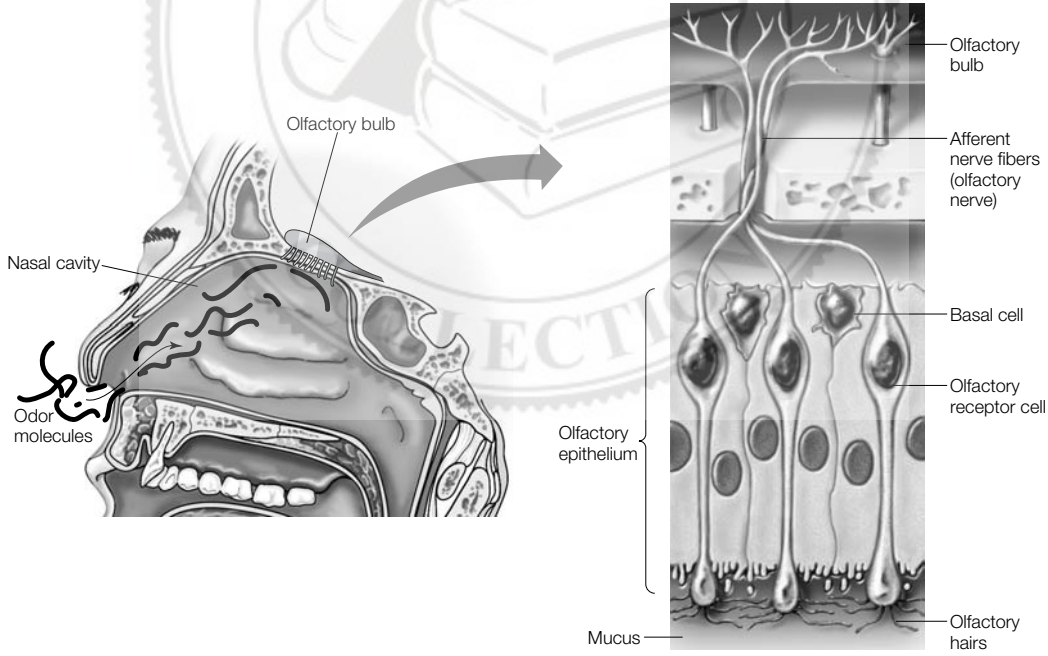
Age-Related Olfactory Changes

Olfaction, or the sense of smell, appears to be reduced with age, as demonstrated by threshold studies of stimulus strength. A decrease in smell is also referred to as hyposmia (Seiberling & Conley, 2004). Evidence shows peaks in the senses of smell and taste during the 20s and 40s, but by the 60s and 70s there is a decline in olfaction. This decline includes reduced ability for both odor detection and identification, especially among males. Over 50% of people age 65 years or older have significant olfactory dysfunction (Arking, 1998; Kovacs, 2004; Seiberling & Conley, 2004). A decrease in the number of olfactory neurons and weakening of olfactory neural pathways to the brain lead to a reduction in the ability to identify and distinguish aromas (Digiovanna, 1994, 2000; Seiberling & Conley, 2004). At the age of 25 years, the olfactory bulb contains approximately 60,000 mitral cells. By the age of 95 years, there are only 14,500 mitral cells. This decline in cell numbers decreases the functional ability of the olfactory neural system

(Bhatnagar, Kennedy, Baron, & Greenberg, 1987). As discussed in "The Nervous System" section, neurofibrillary tangles and amyloid plaques can be observed in the aging brain and have been documented in the olfactory bulb (Kovacs, 1999, 2004). See **Figure 6-21** to identify olfaction pathways and neural correlates. Age-related gender differences include that males show greater declines in detection and identification of odors than do females (Arking, 1998; Kovacs, 2004).

Concerns associated with the declining sense of smell in older populations include the inability to smell harmful odors such as gas or smoke in the home and the inability to smell pleasurable memory-invoking aromas such as flowers (Digiovanna, 1994, 2000; Kovacs, 2004; Stevens, Cain, & Weinstein, 1987). A decline in the ability to smell can also influence the sense of taste, often causing older individuals to change their eating habits and to receive less enjoyment from food (Cowart, 1989; White & Ham, 1997). The decline in smell is much more predominant than the decline in taste, but individuals often say that the sense of taste has changed when actually it is the sense of smell that is impaired (Seiberling & Conley, 2004).

Figure 6-21 The olfactory system.



Source: Daniel D. Chiras, *Human biology* (5th ed.). Sudbury, MA: Jones and Bartlett Publishers, 2005.

Taste

Anatomy of Gustation

Taste, or gustation, and the **chemoreceptors** for taste are located in approximately 10,000 taste buds found mostly on the tongue, but also in the rest of the oral cavity and throat (Sherwood, 1997). Taste receptors constantly renew about every 10 days through generation of new receptor cells (Sherwood, 1997). The four primary tastes include sweet, salty, bitter, and sour with a proposed fifth primary taste known as umami, an amino acid and peptide (Digiovanna, 1994, 2000; Sherwood, 1997).

Age-Related Gustation Changes

Aging causes a decrease in taste, also known as **hypogeusia**, usually more noticeable around the age of 60 with more severe declines occurring over the age of 70 (Seiberling & Conley, 2004). However, the sense of taste seems to decrease only slightly with age and can be variable among individuals (Digiovanna, 1994, 2000). Threshold studies, or studies that evaluate the lowest level of stimulus needed to reach threshold to invoke a response, are often used to measure taste (Digiovanna, 1994, 2000). Threshold studies have demonstrated some age-related, quality-specific changes in taste. The ability to detect salt changes the most with age whereas detection of sugar does not appear to change (Bartoshuk & Duffy, 1995; Cowart, 1989; Digiovanna, 1994, 2000; Weiffenbach, 1991; Weiffenbach, Baum, & Burghauser, 1982). Taste changes with age are not as well understood as changes in smell, but it has been hypothesized that there is a decrease in the number of taste buds as well as a change in taste receptors and cell membrane ion channels with age (Mistretta, 1984; Seiberling & Conley, 2004). Because taste buds have the ability to regenerate every 10 days, any changes in taste are most likely correlated with disruptions in taste receptors and cell membranes. Of course, taste sensation can be disrupted for other reasons including medication use, smoking, disease, infections, and poor oral health (Schiffman, 1997; Seiberling & Conley, 2004). The most common concerns related to changes in taste, which are strongly tied to changes in smell, are food poisoning and malnutrition (Schiffman, 1997).

Vision

The eyes monitor objects and conditions around the body, continually sending sensory messages to the brain such that the body can elicit appropriate responses to the outside environment (Digiovanna, 2000).

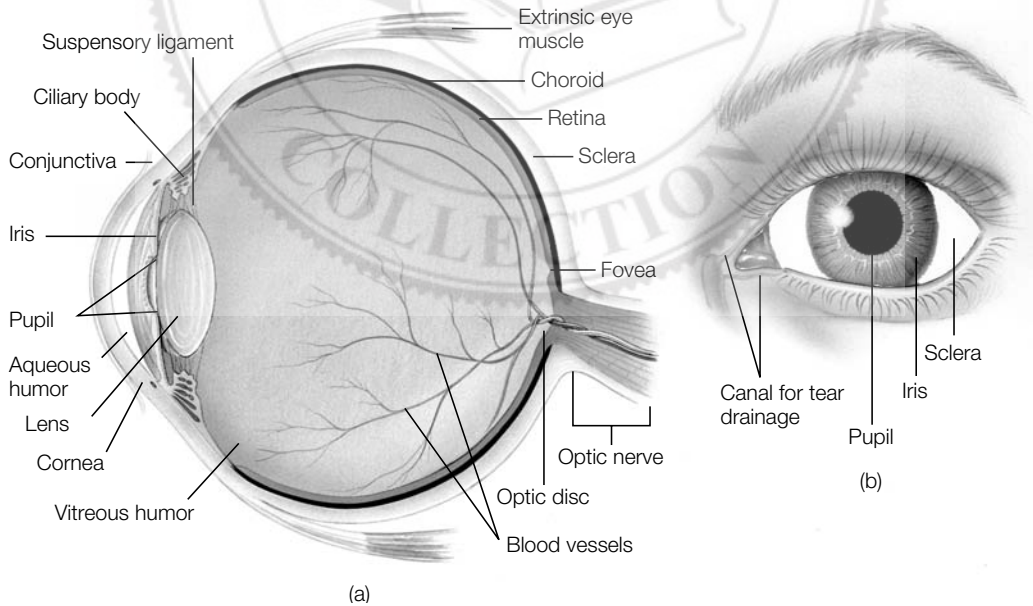
Anatomy and Age-Related Changes in Eye Structure

Many older adults experience dry eyes and/or a feeling of irritation, as if an object is in the eye. This condition is known as dry eye syndrome (Kollarits, 1998). Dry eye syndrome may be explained by age-related decline in the amount of tears produced by the conjuctiva, the thin surface layer of the eye that is exposed to air. The conjuctiva normally helps to lubricate the eye and eyelid (Digiovanna, 1994, 2000; Kalina, 1999). The cornea, a transparent structure behind the conjuctiva, reflects light traveling through the eye; with age the cornea tends to decrease in transparency. This decrease can cause a reduction in the amount of light entering the eye as well as an increase in light scattering (Digiovanna, 1994, 2000). The scattered light still reaches the retina, albeit in incorrect areas causing bright areas in the field of view. This phenomenon is known as glare (Digiovanna,

1994, 2000). See **Figure 6-22** for an overview of the physiology of the eye. Behind the cornea lies the iris, which contains a hole called the pupil. The pupil allows light to pass into the eye (Digiovanna, 1994 2000).

Collagen fibers in the eye begin to thicken and muscle cell numbers decrease with age. These changes reduce the ability of the pupil and iris to work together to constrict and dilate. As a result, the eye is unable to appropriately adapt to changing light intensities (Digiovanna, 1994, 2000; Kalina, 1999). The lens of the eye demonstrates an age-related loss of elasticity that has also been attributed to changes in collagen fibers. With age, the lens of the eye becomes less curved and more flat. In addition, there is a decreased transparency to colors of light, especially blue, and formation of opaque spots that block and scatter light (Digiovanna, 1994, 2000). Retinal rods of the eye that are responsible for low light vision demonstrate age-related changes, whereas retinal cones remain relatively stable (Kalina, 1999). The center of the eye contains vitreous humor, a gel containing collagen fibrils. With age, the vitreous humor loses transparency and there is an increase in the scattering of light, which may potentially cause floaters (Digiovanna, 2000; Kalina, 1999; Kollarits, 1998). The amount of aqueous humor, or fluid between the cornea and

Figure 6-22 Anatomy of the human eye.



Source: Daniel D. Chiras, *Human biology* (5th ed.). Sudbury, MA: Jones and Bartlett Publishers, 2005.

lens, produced declines with age, resulting in structural corneal changes such as flattening (Digiovanna, 2000; Kalina, 1999). All of these age-related structural changes in the eye explain many of the age-associated changes in vision.

Age-Related Changes in Visual Function

One of the most common visual concerns in aging that occurs over time, but which becomes most notable around 40 years of age and older, is **presbyopia** or the inability to focus on nearby objects, such as newsprint. This inability is also known as farsightedness (Digiovanna, 1994; Jackson & Owsley, 2003). Presbyopia is generally corrected using bifocals and trifocals in lenses (Jackson & Owsley, 2003). Several studies have shown a decline in visual acuity, or the smallest object or detail that can be seen, even in individuals wearing corrective lenses. This decline may be correlated with a decrease in the neurons along the visual pathway as well as changes in the actual lens of the eye (Jackson & Owsley, 2003). Sensitivity to contrast, or the ability to observe a pattern in different light and intensity, also declines with age as a result of changes in the optics of the eye. Contrast sensitivity further declines under conditions of low light. Such a decline is likely due to changes in the neural pathways (Jackson & Owsley, 2003; Owsley, Sekular, & Siemsen, 1983; Sloane, Owsley, & Alzarez, 1988). Decline in contrast sensitivity is demonstrated by older individuals' complaints that driving and seeing road signs at night is very difficult, prompting them to drive only in daylight. All of these changes can be associated with aging of the cornea. Corneal aging is characterized by decreased transparency, greater scattering of light, and a flattening effect that results in reduced refraction, as previously described (Digiovanna, 1994). Another common complaint among older individuals pertains to changes in the visual field. Studies have demonstrated a narrowing of both the central and peripheral visual fields in older adults as compared to those of young adults. Narrowing is greater in peripheral fields as a result of disruption in the visual neural pathway (Haas, Flammer, & Schneider, 1986; Jackson & Owsley, 2003; Johnson, Adams, & Lewis, 1989). This decrease in the visual field area causes a lessened ability to visually search environmental surroundings, making it difficult to identify and discriminate objects and moving targets (Jackson & Owsley, 2003). Other consequences of aging changes in the visual neural pathway are demonstrated by decreased detection and awareness of moving objects as well as diminished ability in distinguishing one motion from another very similar motion (Ball & Sekular, 1986; Gilmore, Wenk, Naylor, & Stuve, 1992; Jackson & Owsley, 2003). For instance, a police officer directs traffic around an accident scene on a two-lane highway by motioning one lane to slow and stop while motioning a car in the opposite lane to proceed slowly around. From a distance the older driver may not be able to clearly distinguish the hand movements of the officer until he or she is much closer to the scene. The speed with which individuals can visually process information tends to slow in the older adult. As a result, older adults need to focus on an object for a longer period of time in order to identify and describe it (Jackson & Owsley, 2003; Salthouse, 1993).

Visual attention, divided attention, and selective attention also decrease with aging, more pronounced deficits occurring when objects or information are shown very quickly (Jackson & Owsley, 2003). Impaired divided

attention can be observed when an older adult is given two simultaneous tasks to complete, such as viewing a series of two pictures side by side on a computer screen for 5 seconds. If the older adult is instructed to learn the name on a building in one picture and to count how many animals are in the other picture, he or she will eventually begin to focus on only one picture.

Age-related changes in color vision lead to impaired color discrimination, especially along the blue–yellow color continuum. This indicates increased absorption of short wavelengths and a deficiency in those cones associated specifically with short wavelengths (Jackson & Owsley, 2003). The photoreceptors—rods and cones—also demonstrate age-related changes. The rod photoreceptors aid vision in the dark and in other low-light situations and demonstrate a greater age-related decline in density than do cone photoreceptors. Cone photoreceptors aid vision in regular and bright light situations and are involved in color vision. These photoreceptors maintain relative stability in density with age (Curcio, Millican, Allen, & Kalina, 1993; Jackson & Owsley, 2003). The decline in rod photoreceptors also provides evidence to support the common complaint of older individuals that they do not see as well at night, especially when driving.

Age-Related Eye Diseases

The most common causes of vision loss in the older adult population are cataracts, glaucoma, macular degeneration, and diabetic retinopathy (Heine & Browning, 2002; Jackson & Owsley, 2003; Kollarits, 1998). These are all eye diseases or conditions that present more frequently in the aging population, but should not be considered as usual aging. The presence of cataracts, or a decrease in the transparency of the lens in the eye, is fairly common in the older population and everyone who lives long enough will experience some degree of cataracts (Digiovanna, 1994; Kollarits, 1998). By the age of 75 approximately 50% of older adults will show signs of cataracts and about 25% of these cases will be advanced cataracts, with more instances occurring in women than men (Klein, Klein, & Linton, 1992a). Risk of glaucoma, increased intraocular pressure, is partly genetic but is also subject to environmental influences. Glaucoma causes loss in the peripheral visual field (Duggal et al., 2005; Kollarits, 1998). In general, intraocular pressure increases with age (Kalina, 1999). Around 2% of individuals in the United States over the age of 40 experience glaucoma, with a higher prevalence in African Americans (Kollarits, 1998). Adults age 75 or older also demonstrate a high incidence of macular degeneration (Klein et al., 1992b), which is a major cause of irreversible vision impairment and blindness. It accounts for 22% of cases of blindness in one eye and 75% of cases of legal blindness in adults 50 years of age or older (Klein, Wang, Klein, Moss, & Meuer, 1995). Diabetic retinopathy relates directly to the presence of diabetes. Diabetes is a disease state and not a part of usual aging; therefore, this topic will not be covered in this section.

Hearing

The External Canal

The external canal of the ear consists of the visible external ear opening, known as the pinna or auricle, and the canal that extends to the eardrum or tympanic membrane (Digiovanna, 2000; Patt, 1998). Small vellus hairs cover the entire ear canal and larger tragus hairs concentrate only in the most external portion of the canal (Patt, 1998). Cerumen glands situated in

the ear canal open into hair follicles and onto skin producing the odor associated with cerumen, or ear wax (Patt, 1998). Age-related shrinkage of cerumen glands causes cerumen to become dryer. In turn, there is often blockage of the external canal and a decreased ability to hear (Digiovanna, 2000; Rees, Duckert, & Carey, 1999; Patt, 1998). In aging, the outer ear loses elasticity, external ear canals narrow, and the tympanic membrane stiffens (Heine & Browning, 2002; Schuknecht, 1974). The skin on the ear becomes thinner and more susceptible to tears and infection (Rees et al., 1999). Hair on the external ear becomes longer and denser (Digiovanna, 2000; Patt, 1998).

The Middle Ear

The middle ear consists of three small bones called the auditory ossicles. These bones are the malleus, incus, and stapes (Digiovanna, 2000). The ossicles amplify the vibrations sent from the external ear so as to maintain intensity of the sound wave traveling to the cochlea of the inner ear (Digiovanna, 2000). The middle ear also loses elasticity and the ossicles tend to shrink with age (Heine & Browning, 2002; Patt, 1998; Schuknecht, 1974). Narrowing of the joint space between ossicles occurs as a result of age-related calcification of the joint capsule and deterioration of the cartilage. However, this narrowing does not seem to cause loss of sound waves in the middle ear (Jerger et al., 1995; Patt, 1998; Rees et al., 1999).

The Inner Ear

The cochlea of the inner ear, also called the hearing organ, is spiral in shape and is filled with perilymph liquid (Digiovanna, 2000; Patt, 1998). Within the cochlea, vibrations pass from the perilymph through the vestibular membrane into endolymph, another cochlear liquid, and finally to the basilar membrane (Digiovanna, 2000). See **Figure 6-23** for a representation of ear anatomy as well as changes to the ear and hearing processes. The inner ear shows a loss of elasticity in the basilar membrane as well as degeneration of the organ of Corti, manifested as increased shrinkage and loss of hair cells (Heine & Browning, 2002; Schuknecht, 1974). Degeneration of small blood vessels in the cochlea leads to a reduction in endolymph production and a diminished ability of vibrations to travel through the ear (Digiovanna, 2000). In the auditory portion of the brain, the cortex displays shrinkage, loss of neurons, and decreased blood flow (Heine & Browning, 2002; Schuknecht, 1974). Age-related hearing loss occurs as a result of changes in the inner ear (Digiovanna, 2000; Rees et al., 1999).

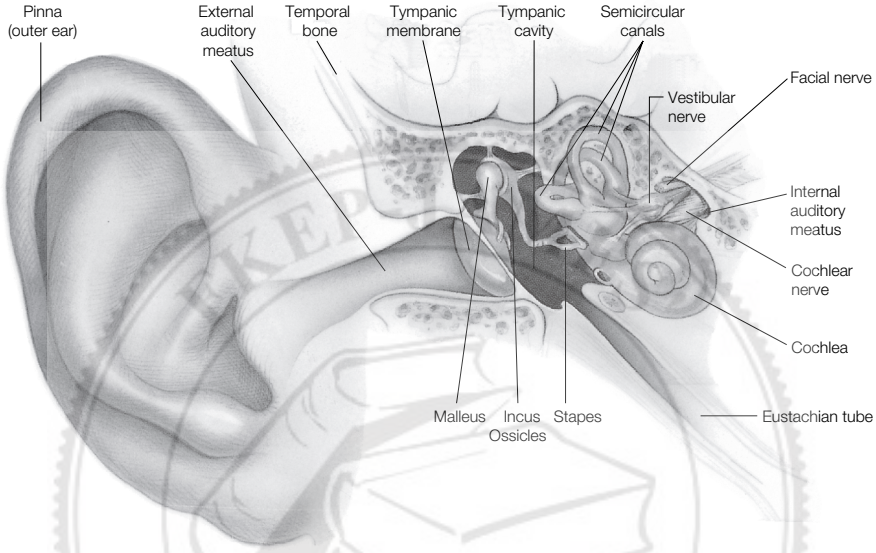
The Vestibular System

The inner ear encompasses the cochlea as well as the vestibule and balance organs (Patt, 1998). In the vestibular system, age-related decline occurs in hair cells, ganglion cells, and sensory nerve fibers (Patt, 1998; Rees et al., 1999). The vestibular system together with the eye and proprioceptors helps to maintain physical balance of the body (Rees et al., 1999). Among those ages 65 or older, 90% of reports of vertigo or other imbalance result in physician office visits (Patt, 1998; Rees et al., 1999).

Hearing Mechanism

Hearing is the result of sound waves entering the external ear and canal, traveling to the tympanic membrane and sending vibrations according to sound wave intensity. These vibrations are relayed to the ossicles and on toward the cochlea, which is considered the hearing organ

Figure 6-23 The anatomy of the ear and the parts of the ear that show changes with age.



Source: Adapted from Beth Hartwell, MD, http://medic.med.uth.tmc.edu/Lecture/Main/ear3.gif

(Jerger, Chmiel, Wilson, & Luchi, 1995). The vibrations initiate a wave motion in the cochlea, causing changes in the basilar membrane and, in turn, stimulating the hair cells in the cochlea. Eventually signals are sent through nerve fibers to the central auditory system (Jerger et al., 1995).

Hearing Loss

Aging changes that cause hearing loss include the alteration and decline in threshold sensitivity, the ability to hear high frequency sounds, and the ability to discern speech (Rees et al., 1999). Age-related hearing loss, also known as **presbycusis**, remains the most common sensory deficit in the older population. Approximately 35% of men and women age 60 to 70 years and 39% over the age of 75 report difficulty with conversation when they are in areas with background noise (Fransen, Lemkens, Van Laer, & Van Camp, 2003; Rees et al., 1999). Typically, hearing loss, observed more often among males than females, occurs in both ears. The ability to hear higher frequency sounds is generally affected the most. Hearing loss is most closely correlated with sensorineural disruption (Fransen et al., 2003; Rees et al., 1999).

A constant decline in hearing is observed in aging. Higher frequencies are affected first and then, with decreased hearing ability, the frequencies become more variable. Hearing acuteness varies with age at the onset of hearing loss as well as with progressive states and hearing severity (Fransen et al., 2003; Rees et al., 1999).

Hearing loss has been physiologically correlated to loss of hair cells and cochlear neurons as well as degeneration of the stria vascularis in the ear (Fransen et al., 2003). Four categories of presbycusis correlate the deterioration in hearing function with the changes in ear physiology, particularly changes in the cochlea. High-frequency hearing loss, or sensory presbycusis, results from the loss of hair cells in the cochlea of the ear. Strial presbycusis results from shrinkage of the stria vascularis. Neural presbycusis develops as a result of cochlear neuron deterioration and can cause a loss of the ability to discriminate words. Finally, cochlear conductive presbycusis causes gradual threshold loss correlated with potential changes in the cochlear duct in the ear (Rees et al., 1999; Schuknecht & Gacek, 1993). Along with usual aging processes, intrinsic and extrinsic factors such as occupation, loud noise, nutrition, cholesterol, and arteriosclerosis also affect the auditory system (Digiovanna, 2000; Rees et al., 1999).

Changes in the sensory system include changes in the anatomy of sensory organs and corresponding neural circuits and brain areas. Age-related changes occur variably for every individual, meaning that one person may not experience noticeable changes while another experiences severe decrements or even complete loss of a sensory system. These changes impact the older adult's quality of life on a variety of levels.

The Integumentary System

The integumentary system consists of the skin and its derivatives, including hair, nails, and the eccrine (sweat) and sebaceous (oil) glands. The integumentary system protects the body's tissues and internal organs, serves as a barrier against injury and infection, regulates body temperature, and acts as a receptor for stimuli of touch, pressure, and pain. It is also the physiological system that is most visible to the human eye, and thus the system that most readily displays the signs of aging.

Skin: Structure and Function

The skin, the largest of all human organs, is composed of three primary layers—the epidermis, the dermis, and the subcutaneous (see Figure 6-20 earlier in the chapter). Each layer has a unique structure and function.

The Epidermis

The **epidermis** is the thin, outermost layer of the skin. It is composed of three primary cell types—keratinocytes, melanocytes, and Langherans cells. **Keratinocytes** produce the protein keratin. As keratin accumulates in the cells, they begin to form a superficial layer of skin (known as the stratum corneum) that serves to protect the surface of the human body. Over time, the cells become entirely keratin-filled and die, at which point they are exfoliated, or shed, and replaced by new cells. This process of cell exfoliation and replacement is cyclical, with one cycle normally lasting 14 to 28 days, depending on the region of the body (M. L. Timiras, 2003).

The **melanocytes** produce **melanin**, a pigment essential to protecting the body from ultraviolet (UV) rays. Exposure to UV radiation leads to DNA and other damage in cells of both the epidermis and dermis. Melanin blocks and absorbs UV radiation and, in so doing, protects against cellular dysfunction and lowers the risk of tumor formation. Because of their role in pro-

tection against UV radiation, melanocytes are found in increased numbers in sun-exposed skin.

The **Langerhans cells**, although they comprise only 1%–2% of epidermal cells (Fossel, 2004), play a critical role in the body's immune defense system, particularly cutaneous immune reactions. These cells recognize foreign antigens and, in response, activate immune defenses. The main functions of Langerhans cells include antigen binding, processing, and presentation to naïve T cells (see "The Immune System" later in this chapter) (Schmitt, 1999). Langerhans cells, in addition to responding to antigens, launch immune responses to tumor cells. Thus, Langerhans cells help to protect the body against both infection and skin cancer.

In addition to these cellular functions, the epidermis plays a critical role in the production of vitamin D_3, which is produced when its epidermal precursor form is activated through the skin's exposure to UV radiation, that is, sunlight (Yaar & Gilchrest, 2001). Ninety percent of the body's supply of vitamin D is produced in this manner (Holick, 2003). Vitamin D_3 plays a significant role in calcium homeostasis and bone metabolism, and deficiencies in vitamin D_3 have been associated with osteoporosis and osteomalacia as well as numerous other diseases, including cardiovascular disease, multiple sclerosis, diabetes, and a variety of cancers (Holick, 2003).

The Dermis

The **dermis** is composed primarily of the connective tissue fibers of collagen and elastin. Collagen provides structure to the skin. Due to its flexibility and extreme strength, collagen offers resistance against pulling forces (Arking, 1998) and thus helps protect the skin from being torn when stretched. Elastin, woven throughout collagen, adds resilience and flexibility to skin. Elastin is responsible for maintaining skin tension while simultaneously allowing skin to stretch to permit necessary movement of muscles and joints.

In addition to its connective tissue structure, the dermis is rich in vasculature. This dense vasculature allows for the provision of nutrients to the epidermis and assists in the control of body temperature through regulation of blood flow. The dermis also contains an abundance of nerves that relay information to the brain in response to a variety of sensory stimuli. Pressure and touch stimuli are detected and responded to by nerve endings known, respectively, as Pacini's and Meissner's corpuscles (see "The Sensory System" earlier in this chapter).

The Subcutaneous Layer

The **subcutaneous layer** is made up of loose collagen and subcutaneous fat. Collagen provides structure to the skin, much as it does in the dermis. Subcutaneous fat, with its rich vasculature, acts as an insulator against extensive heat loss. Thus, this layer of the skin plays an extremely important role in thermoregulation. Fat also serves as a shock absorber to prevent injury and trauma to bone, muscle, and internal organs. In addition, subcutaneous fat acts as a storage area for caloric reserves.

The Aging Skin

Changes in skin structure and function can be classified either as chronological (intrinsic) aging or photoaging. **Chronological aging** refers to those changes considered to be due only to the passage of time (**Table 6-5**). **Photoaging** is the result of chronic exposure to UV radiation. Chronologically aged skin is characterized by thinness and a reduction in elasticity. The

Table 6-5 CHRONOLOGICAL OR INTRINSIC AGING CHANGES OF THE INTEGUMENTARY SYSTEM

	Structure	Function	Consequence
Skin			
Epidermis	Decreased turnover rate of keratinocytes	Prolonged exposure of the epidermal cells to the environment	Increased risk of skin cancer Slower wound repair
	Decreased number of active melanocytes	Weakening of the protective barrier against UV radiation	Increased risk of tumor formation and skin cancer
	Reduction in pigment granules in melanocytes		Reduced ability to tan
	Grouping and increased size of melanocytes		Age spots
	Reduction in number of Langerhans cells	Dampened cell-mediated immune response	Increased susceptibility to infection and tumor development
	Decline in vitamin D_3 production		Increased risk of osteoporosis, osteomalacia, and other diseases
Dermis	Loss of thickness Loss of collagen elasticity and overall loss of collagen	Reduced ability to maintain skin suppleness	Increased likelihood of sagging and wrinkling
	Elastin loses resiliency and becomes more brittle	Reduced ability to return skin to normal tension	Sagging
	Loss of vascularity	Decline in blood flow; impaired thermoregulation	Decrease in skin temperature; dampened ability to adapt to temperature change; reduction in sweat and oil production
	Decline in number of Pacini's and Meissner's corpuscles	Reduced response to pressure and touch	Increased risk of injury; impaired ability to perform fine maneuvers with hands
Subcutaneous	Loss of thickness	Impaired ability to insulate and protect	Increased risk of heat loss and hypothermia; increased risk of injury and bruising

Table 6-5 CHRONOLOGICAL OR INTRINSIC AGING CHANGES OF THE INTEGUMENTARY SYSTEM (CONTINUED)

	Structure	Function	Consequence
Skin Derivatives			
Hair	Thinning and loss; changes in length, appearance, and site of growth; graying		
Nails	Decline in linear growth rate; change in color, texture, and shape		
Eccrine glands	Decreased number of glands	Reduced efficiency of sweat production	Impaired thermoregulation; increased risk of heat exhaustion and heat stroke
Sebaceous glands		Reduction of oil and wax production	Increased roughness, dryness and itchiness of skin

wrinkles caused by chronological aging are usually very fine and thus the skin appears relatively smooth. In contrast, photoaged skin is characterized by deep wrinkles, sagging, and a leathery appearance (Scharffetter-Kochanek et al., 2000). Generally, chronological aging and photoaging become superimposed upon one another and compound each other's effects. However, as can be seen in **Figure 6-24**, most all the visible changes in aged skin are the result of photoaging. Chronological aging primarily affects skin's function rather than its appearance.

With age, there is an overall decrease in the turnover rate of epidermal keratinocytes. By the eighth decade (Fossel, 2004), turnover rate has decreased by as much as 50%. The reduced turnover rate slows the exfoliation-replacement rate of dead keratinocytes. As a result, exposure of epidermal cells to harmful carcinogens is prolonged and the risk of skin cancer increases (M. L. Timiras, 2003). Risk of infection also increases. In addition, decreased epidermal turnover rate contributes to the slower wound repair seen in elderly persons.

The number of active melanocytes also declines with age, at a rate of 10% to 20% per decade (Fossel, 2004). This decline weakens the body's protective barrier against UV radiation, resulting in an increased risk of UV-induced DNA damage. Such damage greatly increases the risk of tumor formation and the development of skin cancer, especially among the elderly population in which the DNA repair rate is slowed (Yaar & Gilchrest, 2001). With age, the remaining melanocytes generally have fewer pigment granules, making aged skin less likely to tan (Krauss Whitbourne, 2002). In addition, the melanocytes tend to increase in size and group together. This results in the so-called age spots that appear on elderly skin.

Figure 6-24 Photoaging (a) versus chronological aging (b).

Source: Reprinted from *Experimental Gerontology,* 35, Scharffetter-Kochanek, K., Brenneisen, P., Wenk, J., Herrmann, G., Ma, W., Kuhr, L., Meewes, C., & Wlaschek, M. Photoaging of the skin from phenotype to mechanisms, 307–316. Copyright (2000), with permission from Elsevier.

Langerhans cells show an age-associated numerical decline of 20% to 50% from early adulthood to late adulthood (Yaar & Gilchrest, 2001). As a result, cell-mediated immune response is dampened with age. In fact, both animal and human studies have found immune system abnormalities to be associated with defects in the structure and function of skin cells (Arking, 1998). A depressed immune response can increase susceptibility to skin infection as well as skin allergens. In addition, when coupled with the reduction in melanocytes' protective action, the weakened immune response only further increases older persons' risk of tumor development.

Finally, vitamin D_3 production by the epidermis declines with age. This is the result of both a decrease in epidermal vitamin D_3 precursor and a reduction in sun exposure among older adults. The lower levels of vitamin D_3 put older adults at greater risk for poor overall bone health, osteoporosis, and numerous other diseases, as mentioned earlier.

In young skin, the epidermal and dermal layers are held tightly together through a series of

interdigitations called dermal papillae, and it is nearly impossible to separate this epidermal-dermal junction. With age, however, there is a flattening of the epidermal-dermal junction as its interdigitated structure is lost. This flattening of the junction allows the epidermis to more easily separate from the underlying dermis. In turn, this separation renders older persons more susceptible to bruising and tearing of the skin as well as to blister formation. Furthermore, the decreased area of surface contact between the epidermis and dermis may compromise communication and nutrient transfer between these two layers of the skin (Yaar & Gilchrest, 2001). The rate of change in the epidermal-dermal junction differs among women and men. In women, changes occur rather sharply between 40 and 60 years of age, most likely as a result of hormonal changes with menopause. Among men, the rate of change is much more constant throughout adulthood (Yaar & Gilchrest, 2001).

The greatest changes in aging skin are seen in the dermis. There is a general thinning of the dermal layer with loss of thickness averaging 20% in older persons (Beers & Berkow, 2000). This thinning of the dermis is due in large part to a general loss of collagen—approximately a 1% loss per year in adulthood (M. L. Timiras, 2003)—as well as a decrease in its flexibility. In addition, elastin becomes increasingly brittle and less resilient. This change in elastin results in a loss of its ability to return to its original tension after it is stretched by the movement of underlying muscles and joints. Consequently, skin is more likely to sag. The overall effect of these changes in the connective tissues of the dermis is the looseness, loss of suppleness, and increased fine wrinkling that is characteristic of old, chronologically aged skin. It is of interest to note that the dermal layer is generally thicker in males than females, and this may account for the apparently greater rate of deterioration of female skin, especially following menopause (Arking, 1998).

With age the dermis also undergoes a decline in vascularity, and blood flow is reduced by approximately 60% (Beers & Berkow, 2000). This reduction results in a decrease in skin temperature, making the skin of older adults generally cool to the touch. Diminished vascularity also contributes to impaired thermoregulation. The avascularity characterizing older skin can give a paler appearance to the skin, and generally the bones and remaining blood vessels beneath the skin become more visually prominent.

Nerve endings in the dermis also undergo changes as a person ages. In particular, the number of Pacini's and Meissner's corpuscles decreases, leading to a decline in the sensations of pressure and touch. Consequently, older persons are more prone to injuries resulting from poor detection of sensory stimuli. In addition, sensory loss leads to a decline in the ability to perform fine maneuvers with the hands.

The skin's subcutaneous layer thins dramatically with age. This loss of thickness occurs primarily in the skin of the face and hands (Arking, 1998). There is a general redistribution of body fat to the intra-abdominal region with age. Thus, skin around the hips and abdomen and subcutaneous thickness may, in fact, increase in these areas (Fenske & Lober, 1986). The subcutaneous layer ordinarily acts as an insulator against excessive loss of body heat. Thus, as it thins, the ability to conserve heat declines, making the older person more prone to low body temperature and possible hypothermia when exposed to the cold (Krauss Whitbourne, 2002). The thinning of the subcutaneous layer also limits its ability to act as a protective cushioning. Consequently, bones, major organs, arteries, and nerves receive more concentrated impacts (Fossel, 2004), in turn increasing the risk of injury and bruising.

Estrogen and Aging Skin

Sex hormones greatly influence the aging process, and the skin is a target organ for these hormones. Therefore, a change in sex hormone levels with age will affect any skin functions that are under hormonal control (Sator, Schmidt, Rabe, & Zouboulis, 2004). Estrogen is a sex hormone and has been extensively studied for its influence on skin aging. Research has shown that the reduction in estrogen associated with menopause is associated with impaired structure and function of the skin (Phillips, Demircay, & Sahu, 2001; Shah & Maibach, 2001). Postmenopausal women receiving hormone replacement therapy (HRT) have been shown to have thicker, healthier skin. Women on HRT show statistically greater collagen content than those not receiving HRT (Phillips et al., 2001). In addition, the skin of those receiving hormonal treatment exhibits less loss of elasticity, in turn exerting a positive effect on skin sagging (Pierard, Letawe, Dowlati, & Pierard-Franchimont, 1995). One national study found that estrogen use may prevent both skin drying and skin wrinkling (Dunn, Damesyn, Moore, Reuben, & Greendale, 1997).

Aging of Skin Derivatives

Hair

Hair is produced by hair follicles underneath the surface of the skin. With age, the germination centers that produce hair follicles undergo changes and may, in fact, be destroyed (Krauss Whitbourne, 2002). As a result, thinning and loss of scalp hair occurs with age, in both men and women. There may also be a thinning of facial hair in men. Simultaneously, however, the hair on older men's eyebrows and inside their ears may become longer and coarser. Similarly, women may develop unwanted facial hair, especially following the hormonal changes associated with menopause.

Hair also tends to gray over time. Graying is due primarily to gradual loss of functional melanocytes from hair bulbs and a general decline in melanin production. The age of onset of graying varies somewhat based on heredity and racial background. For Caucasians, the average age of graying onset is the mid-30s, for Asians late-30s, and for African Americans mid-40s. Despite these variations, however, it can generally be said that by 50 years of age 50% of people have 50% gray hair (Tobin & Paus, 2001).

Nails

The linear growth rate of nails decreases with age (M. L. Timiras, 2003). In addition, nails tend to become thinner, drier, and more brittle as a person ages. Nails also undergo a change in shape, generally become flat or concave instead of convex (Beers & Berkow, 2000). Longitudinal grooves or ridges may also form on the nails.

Glands

Both eccrine glands and sebaceous glands undergo changes with age. The number of eccrine glands decreases by approximately 15% during adulthood (Beers & Berkow, 2000). In addition, the glands' efficiency declines and less sweat is produced. The result is impaired thermoregulation and difficulty in staying cool. This leaves older adults at greater risk for heat exhaustion and heat stroke.

Sebaceous glands do not decrease in number with age; however, the size of the glands decreases with age as does glandular activity. Soon after puberty, oil production declines at a rate of 23% per decade in men and 32% per decade in women (Jacobsen et al., 1985). Clinical manifestations associated with age-related changes of the sebaceous glands include increased dryness, roughness, and itchiness of the skin as well as, in rare

cases, sebaceous gland carcinoma (Zouboulis & Boschnakow, 2001).

The Immune System

The immune system is a network of cells and biochemicals responsible for defending the body against foreign microorganisms such as bacteria, viruses, fungi, and parasites. Whenever the immune system is compromised, the body is left vulnerable to a variety of infections and infectious diseases, from the flu and common cold to tuberculosis and AIDS. The numerous and, at times, life-threatening consequences of a weakened immune system illustrate the tremendous importance of the system in maintaining good health.

The crucial feature of the immune system that makes it such a remarkable system of defense is its ability to distinguish the body's own cells ("self") from any foreign cells or microorganisms ("nonself"). Any foreign substance invading the body is known as an **antigen**. Antigens carry marker molecules on their surface that identify them as foreign. It is these marker molecules that allow for the discernment of self and nonself. In cases where this discernment process fails, the immune system will attack its own cells. This attack of self is termed **autoimmunity** and can lead to a variety of autoimmune diseases, such as rheumatoid arthritis and multiple sclerosis. Once again, these consequences of a disrupted immune system demonstrate its critical role in protecting the health of an organism.

The defense mechanisms of the immune system are divided into two primary types, **innate** (or nonspecific) **immunity** and **acquired** (also called specific or adaptive) **immunity**. Each type of immunity is characterized by its own components and method of function. However, the two must work in close collaboration, often through the use of **cytokines**, to fulfill their common responsibility—the protection of the body against infection and disease.

Innate Immunity

The innate immune system is the one with which a person is born. It is always present and is activated almost immediately upon exposure to an antigen. It is the body's initial attempt at ridding the body of foreign substances. Although innate immunity allows for the general discernment of self vs. nonself, it does not have the ability to recognize a *specific* antigen. Thus, even if the body is repeatedly exposed to the same antigen, the body will react each time to that particular antigen as if it had never before been encountered. Innate immunity does not adapt to or remember a specific antigen. Consequently, it is unable to improve the effectiveness of its defense against that antigen. Innate immunity, therefore, is antigen-independent and results in no immunologic memory of prior encounters with an antigen.

Innate immunity operates through a variety of mechanisms. One of these mechanisms involves the use of physical barriers, in particular the skin and mucosal membranes. The skin may be the most basic and yet one of the most important mechanisms of immunity, because it is the first site most antigens encounter and the site at which many are stopped. Mucosal membranes, such as those lining the eyes, airways, and gastrointestinal and genitourinary tracts, also provide physical barriers of protection. So too do mucosal secretions, such as saliva and tears, which contain enzymes that destroy potential infectious agents.

If an antigen manages to breach physical barriers such as skin and mucosa, the innate immune system continues its attack on the antigen by launching additional defense mechanisms. These include the actions of **macrophages**, **natural**

killer (NK) cells, and the **complement system** as well as the **inflammatory response**.

Macrophages act through a process called phagocytosis. During phagocytosis an antigen is completely engulfed and, through the use of destructive enzymes, literally consumed by the macrophage. Macrophages also secrete cytokines that stimulate the actions of NK cells. When NK cells are activated, they work to kill cells that have been altered through infection by an antigen. Destruction of these cells occurs through two mechanisms. First, NK cells literally punch holes in the membranes of the altered cells and release enzymes that promote self-induced death (or apoptosis) of the altered cells. Second, NK cells release cytokines that target macrophages and enhance their destructive action. Thus, macrophages and NK cells work synergistically to augment each other's actions and thereby provide a stronger defense against invading antigens.

The complement system is a collection of proteins that can kill antigens directly or help to destroy antigens by attaching to and marking them for destruction by macrophages and other cells of the immune system. The complement system also initiates the inflammatory response, which results in the release of several chemical messengers that signal macrophages and other phagocytic cells to destroy the antigen. These chemical messengers also increase blood flow and cause blood vessels to release fluid, resulting in redness and swelling, respectively, at the site of invasion. The swelling helps to isolate an antigen and prevent if from coming in further contact with body tissues. The inflammatory response also generates heat, and thus fever, in an attempt to overheat and kill antigens.

Innate immunity provides an early and strong line of defense against foreign antigens. In addition, the very occurrence of the innate immune response serves as a signal for initiation of the acquired immune response, effectively stimulating further mechanisms of defense. When they act in concert, innate and acquired immunity provide the body with its most powerful protection against infection and disease.

Acquired Immunity

Acquired immunity consists of two branches (**Table 6-6**). The first, **humoral immunity**, is mediated by antigen-attacking proteins called **antibodies** and is responsible for defending the body against extracellular antigens found in the blood and other body fluids or "humors." The second branch, **cell-mediated immunity**, is responsible for destroying intracellular antigens. Acquired immunity involves the actions of two primary types of leukocytes—**B cells** and **T cells**. Both cell types are produced in the bone marrow; however, only B cells continue to mature in the marrow. T cells are transported to the thymus, a small organ behind the breast bone, for maturation. Once both cell types have reached maturity they reside mainly in the lymph nodes and spleen. B cells are involved primarily in humoral immunity and T cells principally in cell-mediated immunity. However, there is strong communication between the two cell types, reflecting the collaborative action of the two branches of acquired immunity.

HUMORAL IMMUNITY

B cells are activated through encounters with antigens. However, not any antigen will activate any B cell. Each B cell is programmed to respond to only one specific antigen. Once activated by this antigen, the B cells undergo a process known as **clonal expansion** in which they multiply to produce a multitude of B cell clones. These clones then differentiate into antibody-producing B cells, or **plasma cells**

Table 6-6 Comparison of Humoral and Cell-Mediated Immunity

Humoral
Principal cellular agent is the B cell.
B cell responds to bacteria, bacterial toxins, and some viruses.
When activated, B cells form memory cells and plasma cells, which produce antibodies to these antigens.

Cell-Mediated
Principal cellular agent is the T cell.
T cell responds to cancer cells, virus-infected cells, single-cell fungi, parasites, and foreign cells in an organ transplant.
When activated, T cells differentiate into memory cells, cytotoxic cells, suppressor cells, and helper cells; cytotoxic T cells attack the antigen directly.

Source: Daniel D. Chiras, *Human biology* (5th ed.). Sudbury, MA: Jones and Bartlett Publishers, 2005.

(**Figure 6-25**). Plasma cells are capable of producing and secreting antibodies against only the specific antigen that initiated the humoral immune response. The antibodies are released into the bloodstream where they bind with the targeted antigen. This binding action neutralizes the antigen and prompts other immune cells, such as macrophages, into action.

Following clonal expansion, not all B cell clones will differentiate into antibody-producing cells. Some will become memory B cells. Upon formation, these memory cells do not produce antibodies; however, they effectively remember the antigen against which they were produced and retain the ability to produce antibodies in the future should the antigen be reintroduced. The memory cells survive, perhaps for years, and circulate in the bloodstream, primed to launch a rapid response if and when they again encounter their antigen. Thus, humoral immunity is characterized by immunologic memory.

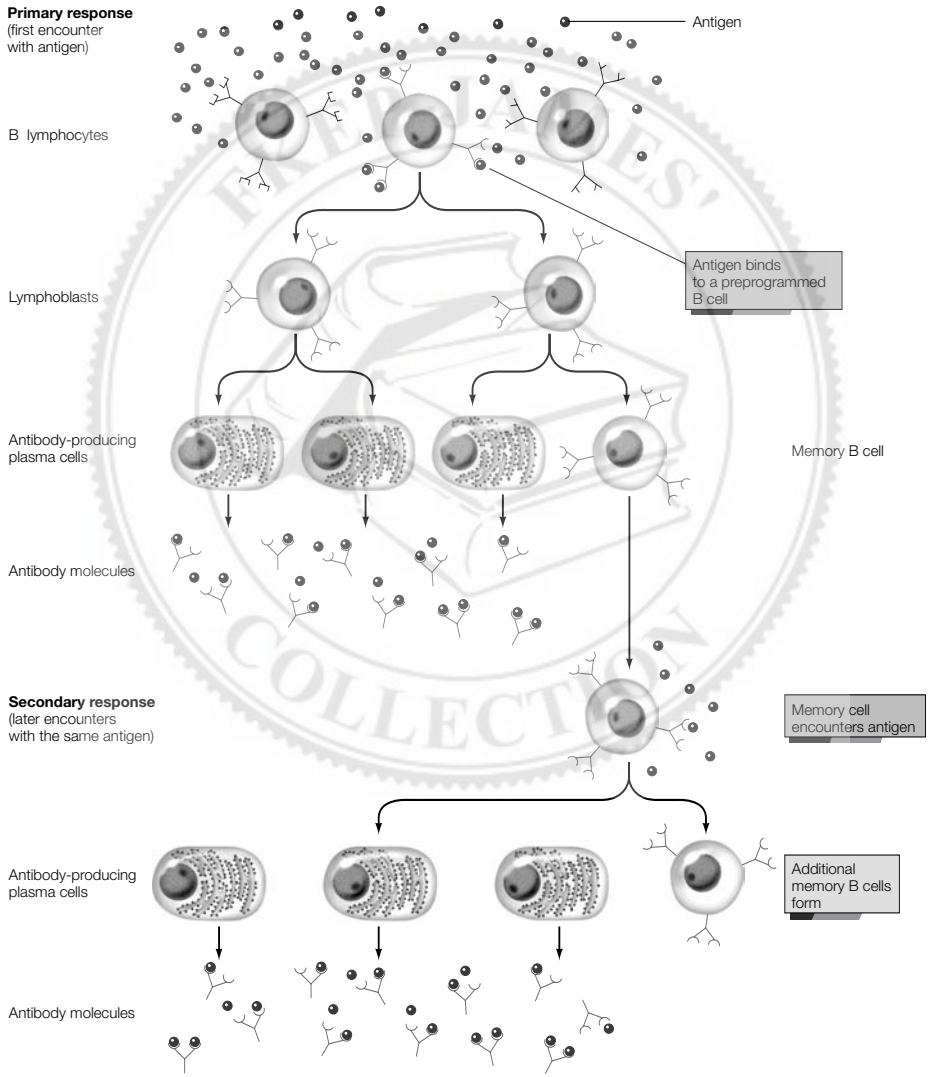
Cell-Mediated Immunity

T cells are of three types—**T-helper cells**, **killer T cells**, and **suppressor T cells** (**Table 6-7**). T-helper cells are the primary regulatory agents of the immune system. They identify foreign antigens and, in response, proliferate through clonal expansion and release chemical messengers that stimulate action of the killer T cells. T-helper cells also have an indirect role in humoral immunity. Only nonprotein antigens have the ability to cause direct activation of B cells. Protein antigens require that B cells first interact with and receive chemical signals from T-helper cells before the B cells can be activated and an antibody-mediated humoral response launched. This T-helper cell activation of the B cells provides an excellent example of the interaction between humoral and cell-mediated immunity.

Killer T cells, also known as cytotoxic T cells, directly attack and destroy infected cells within the body. Most commonly killer T cells operate against virally infected cells; however, they are also responsible for ridding the body of cells that have been transformed by cancer. In addition, killer T cells are the cells responsible for the rejection of organ and tissue grafts.

Suppressor T cells are the final players in an immune response. These cells counteract the actions of T-helper and killer T cells as well as B cells, bringing an end to the immune response

Figure 6-25 B-cell activation. *B cells are stimulated by the presence of an antigen, producing an intermediate cell, the lymphoblast. The lymphoblasts divide, producing plasma cells and some memory cells. Memory cells respond to subsequent antigen encroachment, yielding a rapid, secondary response.*



Source: Daniel D. Chiras, *Human biology* (5th ed.). Sudbury, MA: Jones and Bartlett Publishers, 2005.

Table 6-7 SUMMARY OF T-CELLS

Cell Type	Action
Cytotoxic T cells	Destroy body cells infected by viruses, and attack and kill bacteria, fungi, parasites, and cancer cells
Helper	Produce a growth factor that stimulates T cells B-cell proliferation and differentiation and also stimulates antibody production by plasma cells; enhance activity of cytotoxic T cells
Suppressor	May inhibit immune reaction by T cells decreasing B- and T-cell activity and B- and T-cell division
Memory	Remain in body awaiting reintroduction T cells of antigen, at which time they proliferate and differentiate into cytotoxic T cells, helper T cells, suppressor T cells, and additional memory cells

Source: Daniel D. Chiras, *Human biology* (5th ed.). Sudbury, MA: Jones and Bartlett Publishers, 2005.

once an infection has passed. In addition, suppressor T cells act to dampen the immune response when it becomes overactive. This dampening action is crucial given that overaction of the immune response can lead to both allergic reactions and autoimmune disease. Thus, the action of suppressor T cells is critical to ensuring that the overall immune response remains properly balanced.

Like humoral immunity, cell-mediated immunity is characterized by immunologic memory. During proliferation T cells produce a pool of memory cells. These cells remain dormant until they again come in contact with the antigen they remember; they then unleash a faster and more powerful immune response than the first. Some memory cells are able to survive for the lifetime of an individual. This ability is what provides us with lifelong immunity to diseases such as chicken pox and measles.

Immunosenescence

Immunosenescence refers to the aging of the immune system, and to date the aging process is thought to involve primarily the T cells of the immune system. B cells are less highly affected by immunosenescence.

Thymus Involution

The most prominent morphological change characterizing immunosenescence is the involution, or atrophy, of the thymus. The thymus begins to atrophy around puberty and continues as an individual ages. Extrapolating from known rates of thymic involution, it has been postulated that if an individual were to live to 120 years of age, the thymus would atrophy completely (Aspinall & Andrew, 2000). Given that the thymus is responsible for T cell maturation and differentiation, it is not surprising that the involution of this organ results in changes in the T cell population.

Naïve/Memory T Cell Ratio

At any given time, both naïve and memory T cells are present in the body. Naïve T cells are those that have not yet been exposed to an antigen; these are the cells that respond to any new

antigen that might attack the body. Memory T cells, as discussed earlier, are T cells that are programmed to respond to specific and previously encountered antigens. With age there is a shift in the ratio of naïve T cells to memory T cells. In young persons, this ratio is quite high. Over time, however, many more naïve cells become exposed to antigens and converted to memory T cells. In addition, as a result of thymic involution, fewer naïve T cells are produced with age. As a result of these changes, the population of naïve T cells is depleted over time. Therefore, the ratio of naïve T cells to memory T cells is very low in older persons. Consequently, elderly persons respond much less efficiently to new antigens that may threaten the body (Linton & Korshkind, 2004; Whitman, 1999), leaving them more vulnerable to infection and disease.

Replicative Senescence

The greater the number of B or T cells available to fight off infection and disease, the more likely it is that the immune response will be effective. Thus, the replication or proliferation of immune cells subsequent to stimulation by an antigen is crucial to efficient immune function. However, cells can undergo only a finite number of divisions, after which there can be no further proliferation of cells. This phenomenon is known as **replicative senescence**. Replicative senescence is the result not of the passage of time per se, but of repeated cell division (Effros & Pawelec, 1997). Nonetheless, over time older cells will have experienced more demands for cell division than younger cells. Consequently, older cells are more likely to have exhausted their ability to divide and to have reached a state of replicative senescence. This is particularly true of immune cells that repeatedly encounter their antigens (Effros, Dagarag, & Valenzuela, 2003) (e.g., antigens giving rise to the common cold). In addition to the increased number of cells that reach replicative senescence as a person ages, research has also shown that replicative senescence occurs earlier (i.e., after fewer divisions) in T cells from old individuals. This suggests that T cells may have a reduced ability to proliferate in old age (Wick & Grubeck-Loebenstein, 1997).

The primary result of replicative senescence is a decline in the overall number of immune cells available to ward off invading antigens. In addition, if immune cells reach replicative senescence during an active immune response, they will be unable to continue cell division, thereby leading to premature termination of the immune response (Effros & Pawelec, 1997). Thus, with age the immune response is greatly weakened due to the inability of immune cells to divide indefinitely. Replicative senescence appears to be of particular concern for T cells and cell-mediated immunity.

Cell Signaling

Effective cell-mediated immunity requires that when a T cell binds to its antigen, the presence of that antigen must be communicated or signaled to the interior of the cell. One of the key molecules involved in this signaling process is CD28, located on the surface of T cells. Without the presence of CD28, the cell is unable to respond to an invading antigen and thus remains inactive. With age, there is a progressive increase in the number of T cells lacking CD28. Consequently, there is increased likelihood of disruption to the signaling pathway and, ultimately, T cell function is impaired (Hirokawa, 1999).

Calcium, essential for numerous biochemical reactions, is also crucial for effective cell signaling. In general, calcium deficiency becomes more likely as a person ages. This deficiency contributes to impaired cell signaling within the immune system of older persons. Calcium is also a central

player in the production of cytokines. Thus, calcium deficiency can inhibit production of these chemical messengers, thereby hindering immune system communication and the overall coordination of the immune response (Whitman, 1999).

Autoimmunity

Despite the age-related decrease in immune response to foreign antigens, there is an increase in autoimmunity. There is an overall increase in the percentage of T cells and B cell-generated antibodies that are directed against many of the body's own cells. The reason for the increase in autoimmunity is not well understood. However, it has been hypothesized that although T cells directed against the body's own cells are normally destroyed in the thymus before they are fully matured, involution of the thymus with age allows these cells to persist. In turn these T cells could also prompt B cells to produce autoantibodies—antibodies against the body's own cells. Ultimately, there is an increase in autoimmunity.

Clinical Implications of Immunosenescence

Vaccinations

Due to changes characterizing immunosenescence, older individuals are more susceptible to infection and disease than are younger individuals. One method by which to strengthen the immune defenses is to administer vaccines such as those against influenza and pneumonia. By introducing the body to a foreign antigen, vaccines stimulate the production of antibody-producing B cells as well as memory T cells against the antigen. However, older individuals' antibody response to vaccines is slower and weaker than that seen in younger individuals (Whitman, 1999). In addition, due to the decrease in naïve T cells with age, the T cell response of older persons to a new antigen, such as that introduced by vaccine, may be particularly impaired (Wick & Grubeck-Loebenstein, 1997). T cells of older adults have, in fact, been shown to respond less quickly to vaccines. Overall, the age-related changes in response to vaccines generally render them less effective in older patients.

Infection and Disease

Immunosenescence is associated with increased incidence of infectious disease such as bronchitis and influenza. It is also implicated in the increased incidence of tumors and cancer that occurs with age. In addition, immunosenescence has been associated with a number of age-related autoimmune diseases and inflammatory reactions, including diabetes, arthritis, osteoporosis, cardiovascular disease, and dementia. Inarguably, the aging of the immune system has widespread implications for disease incidence and overall health within the elderly population.

The Hematopoietic System

The hematopoietic system is responsible for the production, differentiation, and proliferation of mature blood cells from stem cells. The site of blood cell production, or **hematopoiesis**, changes with the developmental stage of an organism. In the fetus, blood cells are produced in the liver, spleen, and yolk sac. In children and adults, blood cells are produced in the bone marrow. At birth, the cavities of nearly all bones are filled with active bone marrow; however, by adulthood active bone marrow is found only in the femur, humerus, sternum, vertebrae, and ribs as well as the pelvic bones and some skull bones.

Hematopoiesis

Hematopoiesis begins with **pluripotent stem cells**. Pluripotent describes the cells' ability to differentiate into any of several different types of progeny cells, or **stem cell progenitors**. Each type of progenitor is committed to the production of only one particular type of mature blood cell (e.g., red blood cells, white blood cells, platelets, as discussed below). (See **Table 6-8.**) Pluripotent stem cells and stem cell progenitors comprise the body's stem cell pool. The stem cells are capable of self-renewal and thus, the stem cell pool is maintained throughout an individual's life. The self-renewal capacity of stem cells together with the unlimited differentiation potential of pluripotent stem cells allows for regeneration of all hematopoietic cells as needed.

Hematopoiesis is regulated by a network of several biochemical messengers known as cytokines. Any imbalance in cytokine production or decreased sensitivity to cytokines by pluripotent stem cells and/or stem cell progenitors can result in disruption of hematopoiesis. Likewise, disruption may result from a reduction in the number of pluripotent stem cells available for differentiation into mature blood cells. The hematopoietic system is responsible for a variety of functions, including oxygen delivery to cells, the immune response, and hemostasis, or the control of blood loss. Given the importance of these functions, any interruption to hematopoiesis will have potentially serious consequences for efficient and proper functioning of the body.

The Blood Cells

ERYTHROCYTES

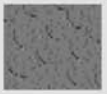
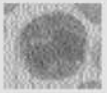
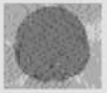
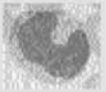
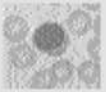
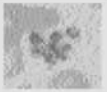
Erythrocytes (Table 6-8), or red blood cells, are biconcave in shape and have no nuclei. They are red in color due to the presence of hemoglobin, an iron-containing protein pigment. Erythrocytes are responsible for the transport of oxygen, which binds to hemoglobin molecules and is then carried from the lungs to the cells where it is needed for metabolism. The efficient delivery of oxygen is a key function of erythrocytes, and the production and functional activity of erythrocytes increases in response to hypoxia, or oxygen deprivation.

Once produced in the bone marrow, erythrocytes mature in 24 to 48 hours. They have a lifespan of approximately 120 days, after which they die and are removed from circulation. Erythrocytes, however, have the capacity for continual self-renewal, allowing for the replenishment of the red blood cell supply. This replenishment balances the routine destruction of erythrocytes and, thus, a relatively constant number of red blood cells is maintained in the circulation.

LEUKOCYTES

Leukocytes (Table 6-8), or white blood cells, are classified on the basis of their nuclear shape as well as the presence or absence of cytoplasmic granules. Leukocytes are of two primary types, granular and agranular, and function principally within the immune system. Granular leukocytes, or granulocytes, include the neutrophils, basophils, and eosinophils. Neutrophils are phagocytic cells that ingest and kill bacteria. Basophils and eosinophils are involved in inflammatory reactions. Agranular leukocytes, also termed mononuclear leukocytes, consist of lymphocytes and monocytes. The lymphocytes include B-lymphocytes and T-lymphocytes, which are involved in humoral and cell-mediated immunity, respectively. (See "The Immune System" earlier in this chapter.) Monocytes are also involved in the immune response. These cells leave the blood and enter tissues where they mature into macrophages, cells necessary for the destruction of infectious agents.

Table 6-8 Summary of Blood Cells

Name	Light Micrograph	Description	Concentration (Number of Cells/mm³)	Life Span	Function
Red blood cells (RBCs)		Biconcave disk; no nucleus	4 to 6 million	120 days	Transports oxygen and carbon dioxide
White blood cells Neutrophil		Approximately twice the size of RBCs; multilobed nucleus; clear-staining cytoplasm	3,000 to 7,000	6 hours to a few days	Phagocytizes bacteria
Eosinophil		Approximately same size as neutrophil; large pink-staining granules; bilobed nucleus	100 to 400	8–12 days	Phagocytizes antigen-antibody complex; attacks parasites
Basophil		Slightly smaller than neutrophil; contains large, purple cytoplasmic granules; bilobed nucleus	20 to 50	Few hours to a few days	Releases histamine during inflammation
Monocyte		Larger than neutrophil; cytoplasm grayish-blue; no cytoplasmic granules; U- or kidney-shaped nucleus	100 to 700	Lasts many months	Phagocytizes bacteria, dead cells, and cellular debris
Lymphocyte		Slightly smaller than neutrophil; large, relatively round nucleus that fills the cell	1,500 to 3,000	Can persist many years	Involved in immune protection, either attacking cells directly or producing antibodies
Platelets		Fragments of megakaryocytes; appear as small dark-staining granules	250,000	5–10 days	Play several key roles in blood clotting

Source: Daniel D. Chiras, *Human biology* (5th ed.). Sudbury, MA: Jones and Bartlett Publishers, 2005. Photos © John D. Cunningham/Visuals Unlimited.

THROMBOCYTES

Thrombocytes (Table 6-8), or platelets, are responsible for hemostasis, the prevention of blood loss. Hemostasis involves the aggregation of thrombocytes to form a clot. The clot then acts to seal off and impede blood loss from wounds.

Aging of the Hematopoietic System

Changes that are most often discussed in regard to the aging hematopoietic system include the reduced proliferative and self-replicative capacity of stem cells and changes in the cytokine network. However, the degree to which these changes are the result of aging per se remains controversial. There is a great deal of evidence to suggest that functioning of the hematopoietic system, when under basal or steady-state conditions, undergoes no significant changes with aging. Many of the changes in the hematopoietic system of older individuals are evidenced only under circumstances, such as hemorrhaging or anemia, in which the system is under stress and experiencing an increase in functional demand.

STEM CELLS AND AGING

The Proliferative Capacity of Stem Cells. Some research suggests that stem cells' proliferative capacity is limited and may decrease with age, reaching a state of exhaustion (Globerson, 1999). As discussed in Chapter 3, reduction in proliferative capacity is thought to result from continual shortening of telomeres, the terminal sections of chromosomes. Once telomeres become too short to allow for further cell replication, cell proliferation ceases. If and when stem cell proliferation is stopped, the body becomes limited in its ability to renew the supply of mature hematopoietic cells. A reduction in mature hematopoietic cells would in turn affect the efficiency with which these cells perform their respective functions, such as oxygen delivery and the immune response.

Telomerase is the enzyme that stimulates the addition of telomeric portions to the end of chromosomes, thereby maintaining the self-renewal capacity of cells. Telomerase activity is upregulated in response to chemical messages from cytokines and down-regulated in response to cell proliferation. Although the action of telomerase may act to limit telomere shortening and subsequent reductions in proliferative capacity, it has not been shown to entirely prevent reduction in telomere length (Engelhardt et al., 1997). Thus, potential methods by which telomerase activity is increased will not lead to a cessation of the loss of proliferative capacity. Furthermore, research has suggested that indeed other factors besides the action of telomerase are involved in regulation of telomere shortening (Lansdorp et al., 1997). Thus, certainly the mechanisms influencing loss of proliferative capacity with age have yet to be clarified and will require further research.

As mentioned earlier, many of the age-related changes in the hematopoietic system are most evident not when the body is in the basal state but when the body is under hematopoietic stress. Hematopoietic stress requires a fairly rapid increase in the number of functional blood cells, thereby necessitating an efficient process of stem cell proliferation. Hence, the reduction of stem cell proliferative capacity illustrates well how age-related changes would be most clearly evident under conditions of stress.

$CD34^+$ Progenitor Stem Cells. **$CD34^+$ cells**, the primary circulating progenitor stem cells, are believed to decrease in number with age. This decrease is evidenced by one study, which found that among normal human volunteers (ages 20–90 years) $CD34^+$ cells exhibited an

inverse correlation with age (Egusa, Fujiwara, Syahruddin, Isobe, & Yamakido, 1998). The decline in $CD34^+$ cells witnessed among older adults ages 66–73 years was similar to that witnessed in centenarians. This research suggests that reduction in $CD34^+$ cell counts is primarily an early age-related phenomenon. Centenarians and those with great longevity are unlikely to exhibit further decreases in $CD34^+$ progenitor cells than that which they experienced in the early stages of aging (Bagnara et al., 2000).

Age-Related Changes in the Cytokine Network

Cytokines involved in the regulation of hematopoiesis include interleukin 3 (IL-3), granulocyte-macrophage colony-stimulating factor (GM-CSF), interleukin 6 (IL-6), and tumor necrosis factor alpha (TNF-α). IL-3 and GM-CSF stimulate proliferation of hematopoietic cells. Conversely, IL-6 and TNF-α act to inhibit hematopoiesis (Balducci, Hardy, & Lyman, 2000; Baraldi-Junkins, Beck, & Rothstein, 2000). These cytokines show changes in older populations, which may implicate them in many of the age-related changes in the hematopoietic system.

The peripheral blood of older individuals is reported to have a reduced capacity to produce IL-3 and GM-CSF (Bagnara et al., 2000), thereby limiting their efficiency in stimulating the production of hematopoietic cells. IL-6 and TNF-α, in contrast, show an increased concentration with age in both animals and humans (Balducci et al., 2000). This increase has the potential to disrupt homeostatic regulation of hematopoiesis and may be partially responsible for poor response to hematopoietic stress with age. Furthermore, increased IL-6 concentrations show an association with increased risk of death, anemia, and functional decline in older persons (Balducci et al., 2003).

Anemia and Aging

Anemia is a condition in which a deficiency in the number of erythrocytes or the amount of hemoglobin they contain limits the exchange of oxygen and carbon dioxide between the blood and tissues. Anemia is a common condition among older persons. Eight percent to 44% of the elderly population suffers from anemia, with a higher prevalence among older men (Nilsson-Ehle, Jagenburg, Landahl, & Svanborg, 2000). These prevalence statistics are based on the World Health Organization's (WHO) criteria for a diagnosis of anemia—hemoglobin less than 12 g/dl blood in women and less than 13 g/dl blood in men (De Martinis & Timiras, 2003).

Despite the relative ubiquitous nature of anemia among elderly persons, it is important to note that most forms of anemia in this population are due to causes other than aging. This is demonstrated by the fact that hemoglobin and hematocrit remain essentially unchanged among healthy older persons. In addition, when anemia is diagnosed in older adults there is almost always another comorbid medical condition present and underlying the anemia (De Martinis & Timiras, 2003). Thus, anemia should not be considered an age-related disease; it is not a universal or even usual condition that develops as the body ages.

Critical Thinking Exercises

1. Choose an age-related disease in which you have a particular interest and then discuss how this disease might impact the functional ability, independence, and psychosocial well-being of an older adult.
2. Many people within and outside the field of geriatrics and gerontology use the term *normal aging* to refer to physiological changes that occur over the passage of time. Do you believe there is such a thing a "normal aging"? Why or why not? How do you believe the use of the term *normal aging* might impact the clinical care received by older adults?
3. Read "No Truth to the Fountain of Youth" by S. Jay Olshansky, Leonard Hayflick, and Bruce A. Carnes in *Scientific American,* Vol. 286, No. 6, pp. 92 to 95 (June 2002). This article can also be found online at http://www.midwestscc.org/archives/Olshansky3.pdf.

   Do you agree with the arguments made by the authors of this article? Discuss your reactions to and thoughts on the article with your classmates. You may also want to consider reviewing the two articles on anti-aging medicine listed in this chapter's Recommended Readings list.

Personal Reflection Exercises

1. Discuss with an older adult (grandparent or great-grandparent) the significant physical changes that occurred as a consequence of the aging process without disease over his or her life course. Focus on changes that led to lifestyle alterations and changes that most affected him or her personally. What specific alterations stand out the most in your mind? Which ones most affect quality of life?
2. Review several Web sites about aging and discuss what healthy aging means from a media perspective versus a research or personal perspective. Compare your own experiences of aging processes with those found in other arenas. How could you use these resources in your nursing practice?
3. Identify preventive techniques that may enhance the aging experience or delay aging processes throughout the life course. Discuss how these techniques work on the body for every organ system and how they might help delay aging or maintain a healthy aging status. Correlate your discussion with older individuals you know. How could you use this knowledge to make you more sensitive towards caring for the aged?

Box 6-2 Recommended Readings

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Box 6-3 Resource List

American Federation for Aging Research: http://www.afar.org/
American Society on Aging: http://www.asaging.org/
Baltimore Longitudinal Study: www.grc.nia.nih.gov/branches/blsa/blsa.htm
Centers for Disease Control: http://www.cdc.gov/aging/
Geriatrics & Aging: http://www.geriatricsandaging.com/
The National Council on Aging: http://www.ncoa.org/index.cfm
National Institute on Aging (NIA): http://www.nia.nih.gov/
National Institution Aging Age Pages: http://www.healthandage.com/html/min/nih/content/booklets/research_new_age/page3.htm
The Nun Study: http://www.mc.uky.edu/nunnet/
The University of California at San Francisco Geriatric Resource Center Online Curriculum: http://www.ucsfagrc.org/
U.S. Administration on Aging (AOA): http://www.aoa.gov/

Glossary

acquired immunity: The branch of the immune system consisting of humoral immunity and cell-mediated immunity

actin: Protein within muscle that, together with myosin, is responsible for muscle contraction

adrenal cortex: The outer portion of the adrenal glands

adrenal glands: Paired glands located above the kidneys

adrenal medulla: The inner portion of the adrenal glands

adrenoceptors (α): Control vessel constriction

adrenoceptors (β): Trigger vessel dilation

adrenocorticotropic hormone (ACTH): Pituitary hormone stimulating the release of glucocorticoids and sex hormones from the adrenal cortex

aldosterone: A mineralcorticoid targeting the kidneys and regulating fluid-electrolyte balance

alveoli: Tiny, spongy air sacs that are the functional units of the lungs and the site of gas exchange

amino acid neurotransmitters: Glutamate is the major excitatory neurotransmitter and gamma-aminobutyric acid (GABA) is the major inhibitory neurotransmitter

andropause: Loss of androgen hormone such as testosterone in aging males

anemia: A disease characterized by a deficiency of erythrocytes

anorexia of aging: Age-related decline in food intake

antibodies: Antigen-attacking proteins of the immune system

antigen: Any foreign substance invading the body

arteries: Carry blood from the aorta to the rest of the body

atria: Two upper chambers of the heart; receive blood from the venous system

autoimmunity: The immune system's attack of the body's own cells

autonomic nervous system: Part of the peripheral nervous system; contains the sympathetic and parasympathetic pathways

B cells: Cells of the immune system that mature in the bone marrow and produce antibodies in response to antigen exposure

barorecepter: Sensory nerve ending in vessels that responds to pressure changes

baroreflex: Reflex stimulated by baroreceptor activity

basic multicellular unit (BMU): Temporary anatomic structure composed of osteoblasts, osteoclasts, vasculature, nerve supply, and connective tissue; responsible for bone modeling and remodeling

calcitonin: A hormone of the thyroid gland stimulating increased uptake of calcium by bone-forming cells

cardiac output: Amount of blood pumped by the heart per minute

cartilaginous joints: Joints composed of two bones separated by a layer of cartilage

catecholamines: Hormones of the adrenal medulla released in response to sympathetic nervous system activity

$CD34^+$ cells: The primary circulating progenitor stem cells

cell-mediated immunity: The branch of acquired immunity responsible for destroying intracellular antigens

chemoreceptors: Receptors related to the abilities to smell and taste

cholinergic neurons: Neurons that release the neurotransmitter acetylcholine, which plays a significant role in learning and memory in humans and animals

chronological aging: The process of physiological change due only to the passage of time

clonal expansion: A process through which B and T cells of the immune system multiply to produce cellular clones

colon: Another term for the large intestine; extends from the small intestine to the rectum

complement system: A collection of proteins of the immune system involved in the destruction of antigens and initiation of the inflammatory response

cortical bone: The outer layer of bone; also known as compact bone

corticotropin-releasing hormone (CRH): Hypothalamic hormone stimulating release of adrenocorticotropic hormone from the pituitary gland

cortisol: The primary glucocorticoid in the human body and a hormone regulating the stress response

cytokines: Chemical messengers of the immune, hematopoietic, and other physiological systems

dehydroepiandrosterone (DHEA): An adrenal sex hormone able to convert to a multitude of other hormones, primarily estrogen and testosterone

dermis: The intermediate layer of the skin

detrusor: Muscle in the bladder

diaphragm: A sheet of muscle located across the bottom of the chest and aiding in respiration through its contraction and relaxation

diastole: Relaxation of ventricles when filling with blood

dopaminergic system: Releases dopamine affecting motor control

elastic recoil: A measure of the lungs' ability to expand and contract

epidermis: The thin, outermost layer of the skin

epinephrine: A catecholamine of the adrenal medulla that regulates the body's stress response; also known as adrenaline

erythrocytes: Red blood cells

esophagus: Extends from th10

the synthesis and release of follicle-stimulating hormone (FSH) and luteinizing hormone (LH)

growth hormone (GH): A pituitary hormone that stimulates amino acid uptake and synthesis of proteins

hematopoiesis: The process of blood cell production

homeostasis: The ability to maintain balance in the organ systems

hormones: Chemical messengers of the endocrine system

humoral immunity: The branch of the acquired immunity mediated by antibodies and responsible for defending the body against extracellular antigens

hypogeusia: Age-related decline in taste

hypophysiotropic: Acting on the pituitary gland

hypothalamic-pituitary-adrenal (HPA) axis: Regulates glucocorticoid levels in the body and allows the body to respond to stressful conditions

immovable joints: Joints composed of collagen fibers and allowing only minimal bone shifting; also known as fibrous joints

immunosenescence: Aging of the immune system

inflammatory response: Redness, swelling, and warmth produced in response to infection

inhibin B: Glycoprotein that suppresses FSH

innate immunity: The branch of the immune system with which a person is born and that is the body's first line of defense against invading antigens

insulin: A pancreatic hormone regulating blood glucose levels through stimulation of glucose uptake

insulin resistance: A resistance to the actions of insulin

islets of Langerhans: Glandular cells of the pancreas

keratinocytes: Cells of the epidermis that produce the protein keratin

killer T cells: T cells that directly attack and destroy infected cells within the body; also termed cytotoxic T cells

Langerhans cells: Cells of the epidermis involved in immune response

leukocytes: White blood cells

lipofuscin: A brown pigment found in aging cells relating to oxidative mechanisms

liver: Largest gland in the body; secretes bile in the small intestine and screens blood from the stomach and intestines for toxins

luteinizing hormone (CH): Hormone released from the pituitary that stimulates ovulation and corpus luteum growth in the female; stimulates testosterone production in males

macrophage: An immune cell that acts as a scavenger, engulfing foreign substances, dead cells, and other debris through phagocytosis

mechanoreceptors: Receptors related to the ability to touch

melanin: A pigment produced by melanocytes and essential to protecting the body against ultraviolet radiation

melanocytes: Cells located within the epidermis that produce melanin

melatonin: A pineal gland hormone that synchronizes internal body functions to a day–night cycle

menopause: Cessation of menstrual cycles within the aging female

mineralcorticoids: Hormones of the adrenal cortex involved in the regulation of extracellular mineral concentrations

monoaminergic system: Release of the neurotransmitters norepinephrine and serotonin

motor unit: The combination of a single nerve and all the muscle fibers it innervates

muscle quality: Strength generated per unit muscle mass

muscle strength: The capacity of muscle to generate force

myocardial cells: Cells located in the heart; also known as cardiomyocytes

myofibril: A contractile filament that comprises skeletal muscle fibers; composed of actin and myosin proteins

myosin: Protein within muscle that, together with actin, is responsible for muscle contraction

natural killer (NK) cells: Cells of the immune system that attack and destroy infected cells

nephrons: Located in the kidneys; combination of the Bowman's capsule and renal tubule with the glomerulus

nerve cells: Neurons within the nervous system that transmit chemical and electrical signals

neurogenesis: Formation of new neurons

neurotransmitter: Chemical messengers located in synaptic vesicles in the neuron

nocturia: An increased number of fluid voids occurring at night

norepinephrine: A catecholamine of the adrenal medulla that regulates the stress response; also known as noradrenaline

olfaction: The ability to smell

osteoblast: Bone cell responsible for formation of new bone and repair of damaged or broken bone

osteoclast: Bone cell responsible for bone resorption

osteocyte: Dormant osteoblast embedded in bone matrix

pancreas: A gland located below the stomach and above the small intestine; secretes pancreatic fluid that neutralizes stomach acid and breaks down large nutrients

parathyroid gland: A group of cells located at the back of the thyroid gland that secretes parathyroid hormone

parathyroid hormone (PTH): A hormone of the parathyroid gland involved in promoting elevation of blood calcium levels

pharynx: Connects the oral cavity to the esophagus

photoaging: The process of change in skin structure and function resulting only from exposure to ultraviolet radiation

pineal gland: A small gland located deep in the brain that secretes melatonin

plaques: Made up of the amyloid β-peptide shown to be neurotoxic; occur outside of the neuronal cell and consist of grey matter with a protein core surrounded by abnormal neurites

plasma cell: Antibody-producing B cell

plasticity: The ability to form new neuronal connections onto available existing neurons

pluripotent stem cells: Cells possessing the ability to differentiate into cells of any other type

presbycusis: Age-related hearing loss that generally occurs at higher frequencies first

presbyopia: Age-related vision loss of objects at close range, known as farsightedness

replicative senescence: A phenomenon in which cells are able to undergo only a finite number of divisions

reproductive axis: Integration of the hypothalamus, pituitary, and gonad to control reproductive hormones

sarcomere: Muscle compartments containing actin and myosin

sarcopenia: Age-related loss of muscle mass

sarcoplasmic reticulum: Portion of the endoplasmic reticulum; membrane network in the cell cytoplasm in striated muscle fibers

skeletal muscle: Muscle under voluntary control; comprises the majority of all muscle mass and is also known as voluntary or striated muscle

slow-twitch fibers: Muscle fibers that contract steadily but are not easily fatigued; used in activities of low intensity and high endurance

stem cell progenitors: The progeny cells of pluripotent stem cells

subcutaneous layer: The innermost layer of the skin

suppressor T cells: T cells that suppress the immune response

synapses: Space between the dendrites on neurons where chemical signals via neurotransmitters are relayed to other neurons

synaptogenesis: Generation of new synapses

synovial fluid: Fluid secreted by the synovium and allowing smooth, easy movement of the bones comprising a synovial joint

synovial joint: Joint connecting two bones containing smooth cartilage on their opposing ends

synovium: Synovial joint capsule membrane that secretes synovial fluid

systole: Contraction of the heart that forces blood into the aorta

T cells: Cells of the immune system that mature in the thymus and play a critical role in cell-mediated immunity

tangles: Paired helical filaments and a few straight filaments that occur in the neuronal cell body; the main protein associated with neurofibrillary tangles is known as tau

T-helper cells: T cells that regulate the immune system

thrombocytes: Blood platelets responsible for blood clotting

thyroid: A small, butterfly-shaped gland located in the lower front portion of the neck

thyroid-stimulating hormone (TSH): A pituitary hormone stimulating the synthesis and release of triiodothyronine and thyroxine

thyroxine (T4): Thyroid hormone involved in metabolic and thermal regulation

total lung capacity: The maximum volume to which the lungs can expand during the greatest inspiratory effort

trabecular bone: The inner portion of bone; also known as spongy bone

triiodothyronine (T3): A thyroid hormone involved in metabolic and thermal regulation

ureters: Tubes connecting the kidneys to the bladder

urethra: Canal that leads from the bladder out of the body

vasopressin: A pituitary hormone responsible for regulation of blood and osmotic pressure

ventilatory rate: The volume of air inspired in a normal breath multiplied by the frequency of breaths per minute; also known as the minute respiratory rate

ventricles: Two lower chambers of the heart; the left ventricle expels oxygen-rich blood into the aorta to be delivered to the entire body excluding the lungs, and the right ventricle expels oxygen-poor blood into pulmonary arteries traveling to the lungs for reoxygenation

vital capacity: The maximum amount of air that can be expelled from the lungs following a maximum inspiration

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Chapter 7

Assessment of the Older Adult

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LEARNING OBJECTIVES

At the end of this chapter, the reader will be able to:

1. Identify the major components of comprehensive assessment of older adults including functional, physical, cognitive, psychological, social, and spiritual assessments.
2. Name some major tools that are frequently used in geriatric assessment.
3. Recognize some of the challenges of conducting comprehensive assessments of older adults.
4. Discuss the role of other health professionals in the assessment of older adults.
5. Describe some of the issues in relation to comprehensive assessment of older adults.

KEY TERMS

- Agnosia
- Aphasia
- Apraxia
- Cataracts
- Cerumen
- Dysphagia
- Functional incontinence
- Glaucoma
- Ketones
- Longevity
- Macular degeneration
- Osteoarthritis
- Osteoporosis
- Otosclerosis
- Overflow incontinence
- Polydipsia
- Polyphagia
- Polyuria
- Presbycusis
- Presbyopia
- Stress incontinence
- Urge incontinence

The basis of an individualized plan of care for an older adult is a comprehensive assessment. Enhanced skills in comprehensive geriatric assessment can improve health outcomes, increase nursing assessment confidence, and provide a role model for health care teams (Stolee et al., 2003). Assessment has been described as the cornerstone of gerontological nursing, and the goal is to conduct a systematic and integrated assessment (Olenek, Skowronski, & Schmaltz, 2003). The health and health care needs of older adults are complex, deriving from a combination of age-related changes, age-associated diseases, heredity, and lifestyle. Assessment requires knowledge and an understanding of this complexity of factors. In assessing and providing care to older adults, nurses are members of a health care team that includes physicians, therapists, social workers, spiritual care workers, pharmacists, nutritionists, and others. Each member of the team has a contribution to make, and nurses are often in a position to draw upon the knowledge of other team members to enhance the assessment process.

Comprehensive assessments can be lengthy, and this presents a challenge to nurses because depending on health status and energy level, the older adult may not be well or strong enough for an extensive physical or verbal-based assessment. If the older adult is experiencing memory problems, the reliability of question-based assessment may be suspect. The role of the family and particularly family caregivers (often spouses and adult children) adds another dimension. The literature suggests that when family members act as proxies for health information, there can be underestimates and overestimates of functional ability, cognition, and social functioning (Ostbye, Tyas, McDowell, & Koval, 1997). Assessment tools do not always identify the source of information, and even experienced nurses sometimes rely too much on secondary sources such as family members and caregivers rather than focusing on the older adult as the primary source of information (Luborsky, 1997).

Since the early 1960s when major tools to measure function were introduced, the number of assessment tools from which nurses can choose has increased exponentially. Part of this increase has been due to the refinement of existing tools and the testing and tailoring of tools across client populations, as well as the creation of new tools. The current growth in the development of clinical practice guidelines has not yet reached the stage where nurses have identified a roster of the "best" tools (see www.geronurseonline.com for examples) to use with older adults across all settings for specific areas of assessment. However, certain tools are used by nurses because they have been used traditionally to provide a foundation for decision making and intervention strategies. In this chapter, we will identify these common tools and provide guidelines for assessment. In addition, several of the chapters in this text give examples of assessment tools related to specific content.

A cautionary note is needed. Comprehensive assessment is not a neutral process; the sources of information and tools used as well as the nurse's skill level have consequences for the older adult's individualized plan of care. The physical and social environment can support or suppress an older adult's abilities. Comprehensive assessment consists of objective and subjective elements, and how the assessment data are interpreted is of major importance. As Kane (1993) has suggested, interpretation is an art, and it is an art that nurses must aspire to master both as students and as practitioners.

Functional Assessment

Nurses typically conduct a functional assessment in order to identify an older adult's ability to perform self-care, self-maintenance, and physical activities, and plan appropriate nursing interventions. There are two approaches. One approach is to ask questions about ability and the other approach is to observe ability through evaluating task completion. However, although we tend to speak of "ability," our verbal and observational tools tend to screen for "disability." Disability refers to the impact that health problems have on an individual's ability to perform tasks, roles, and activities, and it is often measured by asking questions about the performance of activities of daily living (such as eating and dressing) and instrumental activities of daily living (such as meal preparation and hobbies) (Verbrugge & Jette, 1994). The basis of our understanding of ability, disability, physical function, activities of daily living, and any contextual factors comes from work initiated by the World Health Organization (WHO) more than 25 years ago.

The International Classification of Impairment, Disability and Handicap (ICIDH) was first published by the WHO in 1980. It suggested relationships among impairment, disability, and handicap as illustrated by definitions provided in **Box 7-1**. In attempting to move away from a disease and toward a health perspective, the WHO made definitional changes and created a new International Classification of Functioning, Disability and Health (ICIDH-2) in 2001. The ICIDH-2 uses the term *disability* to reflect limitations in activities based on an interaction between the individual's health (including impairment, or problems in body function or structure) and the physical, social, and attitudinal environment. The term *handicap* has been discontinued and, instead, *participation restriction* is used. Kearney and Pryor (2004) have suggested that nursing has not yet integrated the ICIDH-2 framework into research, practice, and education. Specifically, they suggest that the ICIDH-2 framework provides nurses with a broad structure "to address more fully, activity limitations and participation restrictions associated with impairment" (2004, p. 166). Moreover, they argue that in nursing education, students should be encouraged to develop "a health care plan that outlines strategies to promote maximum health, function, well-being, independence and participation in life for the individual" (2004, p. 167). Kearney and Pryor (2004) are, in fact, promoting an "ability" perspective, but it is broadly stated and does not focus specifically on older adults.

Box 7-1 WHO (1980) ICIDH Classification

Impairment: Any loss or abnormality of psychological, physiological, or anatomical structure or function.

Disability: Any restriction or lack (resulting from impairment) of ability to perform an activity in the manner or within the range considered normal for a human being.

Handicap: A disadvantage for a given individual, resulting from impairment or disability that limits or prevents the fulfillment of a role that is normal (depending on age, sex, and social and cultural factors) for that individual.

Taking an "ability" perspective on comprehensive assessment of older adults builds upon the ICIDH-2 framework and is informed by the work of Kearney and Pryor (2004) and others. Functional assessment should first emphasize an older adult's ability and the appropriate nursing interventions to support, maintain, and maximize ability; second, it should focus on an older adult's disability and the appropriate nursing interventions to compensate for and prevent further disability. Nursing interventions that create excess disability are not appropriate. Excess disability is defined as "functional disability greater than that warranted by actual physical and physiological impairment of the individual" (Kahn, 1964, p. 112). For example, assisting an older adult in a nursing home to get dressed in the morning when that individual is mentally and physically able to do this task creates excess disability or disability where it does not exist.

Tools to assess functional ability tend to address self-care (basic activities of daily living or ADLs), higher level activities necessary to live independently in the community (instrumental activities of daily living or IADLs), or highest level activities (advanced activities of daily living or AADLs) (Adnan, Chang, Arseven, & Emanuel, 2005). Advanced activities of daily living include societal, family, and community roles, as well as participation in occupational and recreational activities. In selecting or using tools to measure functional ability, the nurse must be clear on two questions. First, is performance or capacity being assessed? Some tools ask, "Do you dress without help?" (performance) whereas others ask, "Can you dress without help?" (capacity). Asking about capacity will result in answers that emphasize ability. The second question is, who is the source of information on functional ability? Is information gained verbally from the family or from the older adult? Does the nurse assess functional ability by direct observation or by relying on the observations of others?

In 1987, the Omnibus Budget Reconciliation Act (OBRA) mandated the use of the Minimum Data Set (MDS) in all Medicaid- and Medicare-funded nursing homes. This assessment tool attempted to identify a resident's strengths, preferences, and functional abilities in a systematic way in order to better address his or her needs. The MDS was revised in 1995 and a home-based version was also later developed. In this chapter, we will not be looking at this assessment tool. Instead, examples of tools to assess functional ability will be presented in relation to ADL, IADL, and AADL. In addition, the use of physical performance measures will be discussed relative to functional assessment.

Activities of Daily Living (ADLs)

The original ADL tool was developed by Katz and colleagues during an 8-year period at the Benjamin Rose Hospital, a geriatric hospital in Cleveland, Ohio, using observations of patients with hip fractures and their performance of activities during recovery (Katz, Ford, Moskowitz, Jackson, & Jaffee, 1963). The Katz Index of ADL (1970) distinguished between independence and dependence in activities and created an ordered relationship among ADLs. It addressed the need for assistance in bathing, eating, dressing, transfer, toileting, and continence. Other similar tools followed the Katz Index of ADL and are still being developed. Tools can be divided into those that are generic and those that are disease-specific. In this chapter, we will focus on generic tools. Some tools are designed

to provide a more sensitive assessment of ability for older adults with cognitive limitations. Such tools attempt to separate disability stemming from cognitive versus physical limitations. Generally speaking, since the early work of Katz and his colleagues, there has been an emphasis on more detailed assessments of ADL.

One widely used ADL tool is the Barthel Index (Mahoney & Barthel, 1965). This index was designed to measure functional levels of self-care and mobility, and it rates the ability to feed and groom oneself, bathe, go to the toilet, walk (or propel a wheelchair), climb stairs, and control bowel and bladder. Tasks typically assessed with ADL tools are listed in **Box 7-2**. In using the Barthel Index or any ADL assessment tool, it is critical that the assessment be detailed and individualized. For example, the Barthel item for "personal toilet" includes several tasks (wash face, comb hair, shave, clean teeth), and the older adult may be independent in some but not all of them and may require an assistive device for some but not all of them. A detailed assessment will provide information for appropriate nursing interventions, that is, those designed to promote ability and compensate for and prevent further disability for that individual.

Box 7-2 Tasks Typically Assessed with ADL Assessment Tools

Eating	Dressing
Bathing/washing	Grooming
Walking/ambulation	Ascending/ descending stairs
Communication	Transferring (e.g., from bed to chair)
Toileting (bowel and bladder)	

Some older adults, specifically those with cognitive limitations but with good physical abilities, can manage their ADLs with direction and support (cueing and supervising). As pointed out by Tappen (1994), most ADL assessment tools were developed for physically impaired individuals and "are not sensitive to the functional difficulties experienced by the persons with Alzheimer's disease and related dementia" (1994, p. 38). The Refined ADL Assessment Scale is composed of 14 separate tasks within 5 selected ADL areas (toileting, washing, grooming, dressing, and eating) (Tappen, 1994). This scale represents an approach to ADL assessment known as "task segmentation," which means breaking down the ADL activity into smaller steps (Morris & Morris, 1997). For example, the steps of washing one's hands or getting dressed in the morning are fairly complex for someone with cognitive limitations. However, by cueing as needed, the nurse can assess which steps are challenging and which are not. In getting dressed in the morning, some older adults with cognitive limitations will require help in selecting clothing, but once these clothing pieces are selected and laid out, the older adult may require limited cueing to progress through the complex task of dressing. Beck (1988) has developed an assessment tool for dressing in persons with cognitive limitations that is particularly detailed.

The most common scale used in rehabilitation of older adults is the Uniform Data System for Medical Rehabilitation (UDSMR) Functional Independence Measure (FIM). The FIM instrument scores a person from 1 (needing total assistance or not testable) to 7 (complete independence) and is considered an exceptionally reliable and valid tool. Categories measured

include self-care, bowel and bladder, transfer, locomotion, communication, and social cognition (UDSMR, 1996). This measure is done at admission and discharge and several times in between to assess progress in rehabilitation.

Instrumental Activities of Daily Living (IADLs)

Instrumental activities of daily living include a range of activities that are considered to be more complex compared with ADLs and address the older adult's ability to interact with his or her environment and community. It is readily apparent that items in IADL assessment tools are geared more for older adults living in the community; for example, items often ask about doing the laundry. It has also been suggested that IADL tools emphasize tasks traditionally associated with women's work in the home (Lawton, 1972). IADLs include the ability to use the telephone, cook, shop, do laundry and housekeeping, manage finances, take medications, and prepare meals. Missing from most IADL tools are activities that may be more associated with men, such as fixing things around the house or lawn care. One of the earliest IADL measures was developed by Lawton and colleagues (1969). Tasks typically assessed with IADL tools are listed in Box 7-3.

Box 7-3 Tasks Typically Assessed with IADL Assessment Tools

Using the telephone	Taking medications
Shopping	Handling finances
Preparing meals	Laundry
Light or heavy housekeeping	
Light or heavy yardwork	
Home maintenance	Using transportation
Leisure/recreation	

Advanced Activities of Daily Living (AADLs)

Advanced activities of daily living include societal, family, and community roles, as well as participation in occupational and recreational activities. AADL assessment tools tend to be used less often by nurses and more often by occupational therapists and recreation workers to address specific areas of social tasks. One tool that seems to combine elements of ADLs, IADLs, and AADLs is the Canadian Occupational Performance Measure (COPM) (Chan & Lee, 1997). Developed by Law and colleagues (1994), this tool is designed to detect changes in self-perception of occupational performance over time.

The COPM asks older adults to identify daily activities that are difficult for them to do but, at the same time, are self-perceived as being important to do. The tool asks about self-care activities (personal care, functional mobility, and community management), productivity (paid/unpaid work, household management, and play/school), and leisure (quiet recreation, active recreation, and socialization). Consequently, interventions to enhance and support ability are planned to address those activities of importance to the older adult. The strength of the COPM is that it focuses on the older adult's functional priorities by asking about importance so that interventions can be tailored to enhance those priority activities and increase satisfaction.

Physical Performance Measures

One of the criticisms directed toward ADL and IADL assessment tools is that they are highly

Case Study 7-1

You are visiting an older couple in the community in order to assess the couple's functional ability and the potential for their needing assistance with ADLs or IADLs. Mr. and Mrs. Boyd are 72 and 67 years old, respectively, and have been married for 45 years. They have lived in the same neighborhood since Mr. Boyd retired from his bank manager job 12 years ago. Mrs. Boyd has been a housewife since her marriage. Mr. and Mrs. Boyd have one child, a son who lives in another city about 500 miles away. There are no other family members in their community.

As you sit with both of them at the kitchen table, Mrs. Boyd tells you to direct all your questions to her because Mr. Boyd has trouble understanding questions. She goes on to explain that Mr. Boyd used to garden and maintain the yard but no longer seems interested in doing anything. He sleeps a great deal, seems to be eating less, and is often uncommunicative when she speaks to him. She says that her husband is getting quite forgetful and that this worries her because he was always socially engaging and a man who could speak on several subjects.

Mrs. Boyd tells you that she makes all the decisions and spends most of her time planning meals, doing housework, and attending her ladies' church group. She says that she could really use some help with outdoor tasks because these tasks had been handled by Mr. Boyd until just recently. When you ask what she means by "recently," Mrs. Boyd replies that a change seems to have occurred within the last 6 months.

You thank Mrs. Boyd for sharing this information with you, and you indicate that most of the questions can be directed to her but that you will be asking Mr. Boyd some questions as part of the assessment. Mrs. Boyd seems concerned by this but agrees to give you an opportunity to try and ask some questions of Mr. Boyd. You begin your assessment by asking Mrs. Boyd about her functional abilities, including ADLs and IADLs, indicating that you will be asking the same questions of Mr. Boyd.

Drawing from the 10 principles of comprehensive assessment and your knowledge of functional, physical, cognitive, psychological, social, and spiritual assessment of older adults, what are the areas of assessment that you think should be explored first with Mr. and Mrs. Boyd? Will you be relying on self-report, proxy report, performance measures, or all of these for the assessment? Mrs. Boyd seems to want to dominate the interview. How will this affect the assessment process? Which other health professionals do you think should be involved directly or in consultation in relation to your assessment?

subjective, relying on the perceptions of older adults (and sometimes their family members) or on health care professionals who may tend to be conservative in estimating ability (Guralnik, Branch, Cummings, & Curb, 1989). Physical performance measures involve direct observation of activities, such as observing the older adult prepare and eat a meal, but also include tasks related to balance, gait, and the ability to reach and bend. The Physical Performance Test (PPT) is one example of a physical performance assessment tool (Reuben & Sui, 1990). The seven-item version asks the individual to write a sentence, transfer five kidney beans from an emesis basin to a can (one at a time), put on and remove a jacket, pick up a penny from the floor, turn 360 degrees, and walk 50 feet (Reuben, Valle, Hays, & Sui, 1995).

The benefit of using physical performance measures is related to a potential relationship between physical ability and functional ability. The question is, does assessment of physical performance relate meaningfully to the ADL and IADL abilities of older adults? Does difficulty with walking and climbing stairs, for example, go hand-in-hand with ADL and IADL abilities such as toileting or grocery shopping? Findings have been inconsistent due at least in part to the several ways of measuring physical performance and functional ability. Some studies have suggested that physical performance measures provide good information to identify older adults who may be at risk for losing functional ability in ADL and becoming prone to falls (Gill, Williams, & Tinetti, 1995; Tinetti, Speechley, & Ginter, 1988).

Physical Assessment

Conducting a physical assessment of an older adult is based on technical competence in physical assessment, knowledge of the normal changes (Chapter 6) and diseases associated with aging, as well as good communication skills (Chapter 5). In this chapter, a basis in technical competence is taken for granted and the emphasis is on presenting physical assessment information that is particularly relevant to the older adult. Physical assessment with a "systems" approach reviews each body system by first taking a history and then conducting a physical examination. It is important to ask questions that produce an accurate description of the older adult's physical status and furthermore explore the meaning and implications of physical status on an individual basis. The same changes in visual acuity for two older adults may have quite different meanings and implications. For one older adult, the changes may not affect their everyday activities whereas for the other, they may mean the loss of a driver's license and accompanying distress and hardship in relation to unmet transportation needs and decreased social contact.

Physical assessment according to body systems usually involves a health care team approach. Physicians, including specialists such as a cardiologist, and nurses are key members of the team. Nurses may do an initial assessment or act as case finders in the community and in clinics. Other members of the health care team include a nutritionist, respiratory therapist, social worker, physical therapist, and psychologist.

Circulatory Function

Several factors play a role in older adults and their circulatory status. Age-related changes in the heart muscle and blood vessels result in overall decreased cardiac function. These changes plus lifestyle, including limited exercise and physical activity, increase the likelihood that older adults will experience diminished circulatory function. Other lifestyle factors that have an impact on circulatory function are smoking

behaviors and the consumption of alcohol. When the current cohort of older adults was young, the benefits of exercise and physical activity and the detrimental effects of smoking were not common knowledge. The social context was different compared with our current one. The cumulative effects of age-related changes, heredity, and lifestyle mean that there can be great variation among older adults in relation to their circulatory function. In addition, through the use of medications and assistive devices, diminished circulatory function may have a greater or lesser impact on their day-to-day life. Although diseases of the circulatory system can occur at all ages, these diseases are associated with people in their older years, and comprehensive assessment will include taking a cardiac history and performing a physical examination.

The circulatory health assessment should address family history; current problems with chest pain or discomfort, especially if associated with exertion; current diagnoses and associated medications as well as over-the-counter and herbal medicines; sources of stress; and adherence to current medical regimens. The assessment should also include a physical examination, assessing blood pressure, listening to chest sounds, and taking a pulse rate. Other assessment protocols may include an exercise stress test, blood and serum tests, electrocardiograms, and other tests for imaging and assessing the condition of the heart and blood vessels. These advanced assessment protocols are not usually conducted by nurses, but their results provide more detailed assessment information.

Respiratory Function

Age-related changes to bones, muscles, lung tissue, and respiratory fluids all contribute to the respiratory difficulties experienced by some older adults. Older adults are particularly susceptible to respiratory diseases, and the signs of infection may not be as obvious as they are in younger adults. Therefore, assessment of respiratory function should occur more often, particularly with older adults who may have compromised respiratory function because of disease or injury. Older adults who have restricted mobility and have extended bedrest are especially at risk for respiratory infections and serious sequential complications.

The respiratory assessment should ask about current medications (including prescribed, over-the-counter, and herbal) and take a history of smoking behavior and exposure to environmental pollutants during the lifespan. Other areas for assessment include current difficulties and anxieties associated with breathing, decreased energy to complete everyday tasks, frequent coughing, and production of excessive sputum. Physical examination includes observation of posture and breathlessness, and listening to chest sounds. Other assessment protocols include blood and pulmonary function tests, chest x-ray, and sputum analysis. Information from these tests assists the nurse in a total assessment of respiratory function.

Gastrointestinal Function

Age-related changes in the gastrointestinal system are not major and therefore may not be noticed by many older adults. Smooth muscle changes mean decreased peristaltic action and reduced gastric acid secretion, which may affect gastric comfort and appetite. A concern of many older adults is constipation, which is usually defined as the lack of a bowel movement for 3 or more days. Assessment of gastrointestinal function begins with asking about the older adult's usual diet; appetite and changes in appetite; occurrence of nausea, vomiting, indigestion, or other stomach discomforts; and problems with

bowel function. Questions about medication use including prescribed, over-the-counter, and herbal remedies are also standard. Diagnostic testing can include barium enemas and x-rays, stool analysis, and examination of the colon.

For some older adults, constipation is a health problem. The nurse should ask about exercise, diet, and fluid intake, and whether the older adult is using prescribed, over-the-counter, or herbal remedies to deal with constipation. A 3- to 7-day meal diary can illustrate eating habits that might have an impact on constipation. Limited ingestion of fresh fruits and vegetables and fluids contributes to constipation, as does limited exercise and mobility. Older adults have a diminished sense of thirst, and fluid intake may be inadequate to maintain normal bowel function.

Oral health assessment is an area often overlooked with older adults, and nurses should routinely ask about oral health practices including brushing, flossing, and regular contact with a dentist. Examination of the mouth should include observing the condition of the tongue, teeth, and gums for dehydration, infection, and poor oral hygiene. Check dentures to be sure they are well-fitting, particularly if a weight change has occurred. Especially at risk for oral health problems are older adults with limited incomes who cannot manage regular contact with a dentist and older adults in long-term care facilities who lack the physical or cognitive ability to maintain self-care in oral health.

Genitourinary Function

Age-related changes in the genitourinary system along with age-related diseases such as diabetes and hypertension can have a major impact on everyday life. Bladder muscles weaken and bladder capacity is lessened. Difficulties in sensing that the bladder is not empty may mean that residual urine stays within the bladder, creating a medium for potential infection. Older women are more likely to experience incontinence, which is often related to a history of childbirth or gynecologic surgeries. Older men may develop problems with an enlarged prostate that impedes the flow of urine through the urethra. Incontinence is not a normal part of aging; when incidents of incontinence occur regularly, this can lead to embarrassment, restricted social activity, and skin problems. Unmanaged incontinence is a major factor in the decision for nursing home placement. A serious medical problem, chronic renal failure can arise as a complication of age-related diseases such as diabetes and hypertension. This is a potentially life-threatening illness that requires specialized care and may ultimately mean support through kidney dialysis.

Health history questions should attend to any previous or current difficulties related to the frequency and voluntary flow of urine during either the day or night. If incontinence is a problem, then questions should focus on the type of incontinence: **stress**, **urge**, **functional** or **overflow** (see Chapter 12). Older adults who have problems with continence may restrict their fluid intake, which will have implications for other body systems including skin condition and the gastrointestinal system. The nurse should ask about fluid intake, especially caffeine and alcohol (which affect bladder tone) and observe the skin for dehydration. The nurse also should ask about medication use (prescribed, over-the-counter, and herbal remedies). Diagnostic tests include urine analysis tests for blood, bacteria, and other components such as **ketones**. Other diagnostic tests may be ordered by the physician to assess bladder muscle tone and function and prostate size and potential obstructions.

Sexual Function

Two of the prevailing myths in our society are that older adults are neither sexually active nor interested in sexual relationships. This is not the case; however, several factors associated with aging do have an impact on sexual activity, including lack of partner (often through widowhood), chronic illnesses, and medication use that may negatively affect performance. In conducting a comprehensive assessment with an older adult, asking about sexual function is appropriate. However, it is important to be knowledgeable about age-related and disease-associated changes in relation to sexual function and to be sensitive and respectful of privacy because this is clearly a very personal area of human function.

Age-related changes for men include a decrease in the speed and duration of erection; in women there is a decrease in vaginal lubrication. Health and social factors may have a great impact on sexual activity among older adults. Chronic illness such as osteoarthritis and diminished positive self-image because of a societal emphasis on youthful beauty are two such factors. Assessment questions should focus on sexual function and whether there have been any changes or concerns. These questions can open the door to further dialogue. In the past few years, there has been a great deal of advertising on erectile dysfunction drugs by pharmaceutical companies, and these drugs are being used by men and women. The advertising is aimed at middle-aged and older adults, and there may be some natural curiosity about these new drugs. An older adult's questions about enhancement medications might be best answered in consultation with a pharmacist because of potential side effects and interactions with other medications.

Neurological Function

The neurological system affects all other body systems. Age-related changes involve declines in reaction time, kinetic and body balance problems, and sleep disturbances. Age-related diseases such Alzheimer's disease and Parkinson's disease and other health problems such as stroke can lead to cognitive changes including memory loss, spatial orientation, **agnosia**, **apraxia**, **dysphagia**, **aphasia**, and delirium. Dementia is a collection of diseases where the changes in brain cells and activity lead to progressive loss of mental capacity. Alzheimer's disease is the most common disease of dementia. Cognitive assessment for dementia will be discussed in a later section of this chapter.

Neurological assessment of older adults includes several components. The nurse should ask about medications (prescribed, over-the-counter, and herbal remedies) and any medical diagnosis related to the neurological system, such as history or family history of stroke. The nurse should observe and ask about previous and current impairments in speech, expression, swallowing, memory, orientation, energy level, balance, sensation, and motor function. Other areas of assessment relate to the occurrence of sleep disturbance, tremors, and seizures.

Musculoskeletal Function

Several age-related changes occur in the musculoskeletal system and lead to decreased muscle tone, strength, and endurance. The stiffening of connective tissue (ligaments and tendons) and erosion of articular surfaces of joints create restrictions in joint mobility. Declines in hormone production contribute to bone loss, and the ability to heal is reduced. Common musculoskeletal health problems include **osteoarthritis** and

osteoporosis. Of particular concern are the risk of falls and the potential for fractures with associated morbidity and mortality.

The most commonly reported illness among older adults is osteoarthritis, and it is more likely to occur in the weight-bearing joints, especially the hips and knees. Because sore and stiff joints are universally associated with aging, older adults and health professionals often take an accepting attitude about these complaints. The nurse should be asking about the history of sore joints: Which joints are affected? How long has there been pain? What kind of pain is it? Does it interfere with everyday activities? Is the pain managed? If so, how is it managed? Is there a history of bone and muscle injuries? Has there been surgery? Are you trying alternative and complementary therapies such as acupuncture or herbal remedies? What are the pertinent lifestyle factors for this older adult, including participating in exercise and physical activity?

Observation of posture, stance, and walking can assist in asking the appropriate questions: Does the older adult favor one side of the body while walking? Are assistive devices such as canes and walkers being used? Canes and walkers should be at the appropriate height in relation to body height. Ask whether an assessment was done by a therapist in selecting the height, weight, and type of cane or walker. In observing walking and rising from a chair, attend to body language and facial expressions that indicate discomfort. Observe and examine the kind of footwear being worn. Does the footwear offer adequate support while promoting good circulation?

The Up and Go Test provides a quick assessment of an older person's mobility and overall function. The nurse should measure a distance of 10 feet from the person's chair and ask him or her to rise, walk to the line, turn, walk back, and sit down. An average time to do this is 10 seconds. Greater than this may indicate functional problems with ambulation (Reuben et al., 2003).

Osteoporosis causes a gradual loss of bone mass, and bones become porous and vulnerable to fracture. Osteoporosis is associated with aging, heredity, poor calcium intake, hormonal changes, and a sedentary lifestyle. Older adults with osteoporosis experience symptoms of chronic back pain, muscle weakness, joint pain, loss of height, and decrease in mobility. Bone density tests can compare bone mass with individuals of comparable or younger ages as a marker. If needed, calcium intake can be increased through diet or supplements. The nurse should ask about symptoms and whether a bone density test has been carried out; if so, what were the subsequent recommendations?

Sensory Function

Age-related and disease-related changes in sensory function can have profound effects on older adults and their day-to-day functioning. Of the five senses—hearing, vision, smell, taste, and touch—it is the occurrence of diminished vision and hearing that seem to have the greatest impact on older adults. **Presbyopia** refers to an age-related change in vision. The lens of the eye becomes less elastic and this creates less efficient accommodation of near and distant vision. **Presbycusis** refers to age-related progressive hearing loss. Decrements in vision and hearing can affect communication ability with potential consequences to older adults' health, safety, everyday activities, socialization, and quality of life. Screening tools for vision and hearing are of two types: self-report and performance-based.

Specifically for vision, difficulty in reading has implications for safety in relation to reading instructions on prescription bottles and following other written directions for health care. Age-related **macular degeneration**, the dete-

rioration of central vision, is the leading cause of severe vision loss in older adults in the United States. Older adults should undergo regular eye examinations for changes in vision (including the formation of **cataracts**) and screening for ocular pressure (for **glaucoma**). These performance-based tests are conducted by other health professionals—optometrists and ophthalmologists—but nurses are often in a key position to screen for vision problems and to encourage older adults to initiate and maintain regular visits with other health professionals to assess vision changes.

The following screening procedures are simple tests for functional vision: 1) ask the older adult to read a newspaper headline and story and observe for difficulty and accuracy; and 2) ask the older adult to read the prescription bottle and again, observe for difficulty and accuracy. It is important to follow up with specific questions that explore the vision problem from the perspective of the individual: Is vision a problem? Does it interfere with everyday activities or with hobbies and social life? Are magnification aids or enlarged printed material useful strategies? Is home lighting contributing to the problem? Is it more difficult to see in the evening compared with other times of the day?

Hearing loss is a major concern for many older adults. According to the U.S. Census Bureau (Bureau of the Census, 1997), about 30% of older adults between of 65 and 74 years of age and 50% of those between 75 and 79 years of age experience some hearing loss. Most hearing

Box 7-4 Research Highlight

Aim: To evaluate ear and hearing status in a retirement facility

Methods: The research was conducted in a multilevel retirement community with three groups of residents: "independent living" ($n = 22$), "assisted living" ($n = 16$), and "nursing care ($n = 11$) for a total of $n = 49$ residents. Earwax occlusion, pure tone multilevel hearing impairment, resident- and staff-reported hearing handicap, and cognitive status were measured at time 1 and time 2 (1–4 months after time 1).

Findings: Moderate but significant positive correlations were found between hearing impairment and resident-reported hearing handicap; hearing impairment and staff-reported hearing handicap; and resident-reported hearing handicap and staff-reported handicap. Moderate but significant negative correlations were found between cognitive function and hearing impairment and cognitive function and earwax occlusion.

Conclusion: A higher incidence of earwax occlusion, moderate or greater hearing impairment, and cognitive limitations were found for residents in assisted living and nursing care compared with residents in independent living. Recommendations for ear examination, hearing screening, and communication strategies are given.

Source: Culbertson, D. S., Griggs, M., & Hudson, S. (2004). Ear and hearing status in a multilevel retirement facility. *Geriatric Nursing, 25*, 93–98.

loss in older adults is both symmetric and bilateral, and hearing problems are exacerbated in a noisy environment. Nonaging-related hearing loss can be attributed to **cerumen** impaction, infection, occurrence of a foreign body, or **otosclerosis**. Assessment questions should ask about any hearing problems and how these problems affect the older adult's everyday life. The following question is useful in assessing ear and hearing problems: Are you experiencing a hearing problem or any ear pain, ringing in the ears, or ear discharge? A recent study reported that asking, "Do you have a hearing problem now?" was effective in screening for hearing loss among older adults (Gates, Murphy, Rees, & Fraher, 2003). An initial assessment question might be, Tell me when your hearing loss is the biggest problem for you? The nurse who assesses hearing function is in a good position to recommend further diagnostic testing with an audiologist.

For older adults who wear hearing aids, the condition and working order of these aids is often overestimated and should be regularly assessed and monitored. A recent study conducted in a retirement community reported that for most of those wearing hearing aids, a visual check indicated problems with either broken or missing components, inappropriate volume setting, and weak or dead batteries, and this was especially true for those older adults who were relatively dependent on nursing care (Culbertson, Griggs, & Hudson, 2004).

The other senses are taste, smell, and touch. Taste and smell are interrelated, and the sense of smell influences the sense of taste in food. Although there are some age-related changes (for example, fewer taste receptors), older adults who are experiencing a noticeable loss of taste and smell generally have other medical conditions (Ferrini & Ferrini, 2000). Medical conditions, especially those affecting the nose; medication side effects; nutritional deficiencies; poor oral hygiene; and smoking can all detrimentally affect the senses of smell and taste. Assessments should ask generally about satisfaction with taste and smell, the duration and extent of the problem, and the impact of the problem on everyday life.

Integumentary Function

Age-related changes to the skin include loss of elasticity, slower regeneration of cells, diminished gland secretion, reduced blood supply, and structural changes including loss of fat. This means that the skin of older adults is more susceptible to injury and infection and less resilient in terms of repair. Older adults with decreased mobility and extended bedrest are at high risk for skin damage and breakdown. For many older adults, skin dryness and itching are two common complaints. Emollients and powders can bring relief for most minor skin conditions.

Asking questions about skin problems and concerns and inspecting the skin are basic elements of assessment and should be done on a regular basis. If skin injury has already occurred, close monitoring and treatment are essential. The nurse should ask about rashes, itching, dryness, frequent bruising, and any open sores. Skin conditions can be linked with nutritional status and body weight, and the nurse can work with a nutritionist to promote a healthy diet and appropriate weight. Any loss of sensation, particularly in extremities, is a cause of concern. Impeded circulation with lack of sensation can lead to untreated skin breakdown, and prevention is preferable to the more serious consequences of infection and disability. In the event of wounds, there are assessment tools to gauge

the extent and level, such as the Braden Wound Index. Nurses with expertise in wound care are usually available in acute and long-term care for consultation and advice. This is often a specialized area of nursing practice.

The older adult's skin should be observed for color, hydration, circulation, and intactness. Fluid intake may be less than optimal and result in severe dryness. The nurse should be asking questions about skin changes, signs and symptoms of infection, usual skin care, and problems with healing. The nurse should also observe the finger- and toenails for splitting and tears.

Endocrine and Metabolic Function

Age-related changes in endocrine function include decreased hormone secretion and breakdown of metabolites. Of special concern for older adults is the onset of diabetes mellitus or thyroid disease because these diseases can be insidious and silent. Much damage to the body can occur even before these conditions are diagnosed. Diabetes mellitus becomes more prevalent with age but the symptoms of **polydipsia**, **polyphagia**, and **polyuria** may go unnoticed for several years. Because the thirst sensation diminishes with age, older adults may not be aware of their polydipsia. By the time the disease is diagnosed, more serious complications, such as impaired circulation and foot ulcers, may have ensued. In terms of thyroid disease, the formation of nodules that interfere with normal thyroid functioning becomes more common with age. Hypothyroidism and associated symptoms of fatigue, forgetfulness, and cold sensitivity, unfortunately may be seen as normal "slowing down" with age and go undetected. Hyperthyroidism is much more likely in the older years, but among older adults, the typical symptom or restlessness and hyperactivity may be lacking.

The more common form of diabetes mellitus among older adults is type 2 or noninsulin dependent diabetes mellitus. With age, there is an increased resistance to the action of insulin within the body, and this change in combination with lifestyle choices place some older adults at inordinate risk for developing this disease. Age-related changes, heredity, obesity, poor nutrition, inadequate physical activity, and other illnesses increase the likelihood of type 2 diabetes among older adults. Given that the disease may be silent for many years, it is critical that nurses be attuned to assessing for the risk for developing diabetes among older adults and monitor changes and symptoms at every opportunity. As part of the health history, the following areas should be addressed:

- Family history of diabetes
- Changes in weight and appetite
- Fatigue
- Vision problems
- Slow wound healing
- Headache
- Gastrointestinal problems

More specific symptoms should be assessed including occurrence of polyphagia, polydipsia, and polyuria. Diagnostic tests such as fasting blood sugar can provide a definitive diagnosis. The oral glucose tolerance test is of little value by itself because the older adult may have impaired glucose tolerance but not diabetes (Armetta & Molony, 1999).

For older adults, hyperthyroidism or an overproduction of thyroid hormone does not usually mean major changes to everyday life. Nursing observation and assessment questions should address the occurrence of nervousness, heat

intolerance, weight loss, tremor, and palpitations. Hypothyroidism or below normal levels of thyroid hormone causes several changes that can be uncomfortable and distressing. In the health history, the nurse should be assessing for skin changes (dry, flaky), fluid retention (edema and weight gain), fatigue, forgetfulness, constipation, and unusual sensitivity to the cold. Diagnostic tests (TSH test, TRH test, and radioimmunoassay) provide definitive diagnosis.

Hematologic and Immune Function

Several factors affect older adults' hematologic and immune systems. In relation to hematologic function, anemia is a common disorder among older adults, especially among those in nursing homes. Although a slight decrease in hemoglobin occurs with aging, more often the anemia is attributable to an iron deficiency or another illness. About 40% of adults age 60 or older have iron-deficiency anemia. Assessment should focus on observation of the color and quality of the skin and nail beds, and address food choices and food habits. Of a more serious nature, iron deficiency can occur because of blood loss, and the nurse should ask questions about occurrence of blood in stools. Diagnostic tests include hemoglobin, hematocrit, complete blood count (CBC) and red blood cell (RBC) count.

The immune system functions to protect the body from bacteria, viruses, and other microorganisms. Age-related changes to the immune system include diminished lymphocyte function and antibody immune responses. These changes put older adults at risk for infections. Vaccines for influenza and pneumonia are given around mid-October and are available in physician's offices, public health agencies, and other sites. As part of the assessment, the nurse should ask about recent and current infections and access to and use of vaccines to prevent infections. In terms of the symptoms of infection, it is important to remember that in evaluating vital signs, older adults tend to have a diminished febrile response to infection.

Some nurses are uncomfortable talking with older adults about sexual activity, prophylaxis, and sexually transmitted disease (STD), but these questions are an essential part of the health assessment process. Sexually active older adults, particularly those with more than one partner, are at risk for STDs. Of particular concern is the lack of STD education ("safe sex") programs focused on older adults, specifically HIV education. Human immunodeficiency virus (HIV) is a human retrovirus that causes acquired immune deficiency syndrome (AIDS). The disease is spread through parenteral and body fluids. The disease can be sexually transmitted through anal, oral, and vaginal intercourse.

AIDS is epidemic in the United States, and the Centers for Disease Control report that 11% of those infected are 50 years of age or older. Older adults may not be tested for HIV because they do not believe that they are at high risk or they may be unwilling to discuss their risky sexual behaviors (Ferrini & Ferrini, 2000). In terms of assessment, it is important to address the topic of sexual activity and ask the same questions that would be asked of a younger person. Open-ended questions are preferable, and it will be more productive to say, "Tell me about your sex life" rather than simply asking, "Do you have sex?" (Anderson, 2003). Depending on the status of sexual activity, other questions related to sexual preference and number of partners should be pursued. Signs and symptoms associated with HIV such as weight loss, dehydration,

ataxic gait, or fatigue may go unnoticed or be attributed to age-related changes. However, once risk factors are identified, diagnostic testing will confirm a diagnosis.

Cognitive Assessment

Changes in cognitive function with age vary among older adults and are difficult to separate from other comorbidities (physical and psychological conditions), other age-related changes (for example, hearing), and changes in intellectual activity. Generally speaking, older adults manifest a gradual and modest decline in short-term memory and experience a reduction in the speed in which new information is processed (Ferrini & Ferrini, 2000).

Cognitive function is usually understood in relation to the qualities of attention, memory, language, visuospatial skills, and executive capacity. The most extensively used cognitive assessment tool is the Mini Mental State Examination (MMSE) (Folstein, Folstein, & McHugh, 1975). The MMSE was originally developed to differentiate organic from functional disorders and to measure change in cognitive impairment, but it was not intended to be used as a diagnostic tool. It measures orientation, registration, attention and calculation, short-term recall, language, and visuospatial function. It does not measure executive function, and the results of the MMSE can vary by age and education, with older individuals and those with fewer years of formal education having lower scores (Crum, Anthony, Bassett, & Folstein, 1993). In addition, some of the MMSE items may be less relevant for older adults who are hospital in-patients or who are living in long-term care facilities. For example, orientation-based questions regarding dates and day or time may be less relevant for long-term care residents compared with items that ask about location of their room in the facility.

Dementia is a permanent progressive decline in cognitive function, and Alzheimer's disease is the most common form of dementia. The *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition (DSM-IV) used by both the psychiatric and psychological communities states that dementia of the Alzheimer's type typically is manifested by both impaired memory (long- or short-term) and inability to learn new information, or recall recent information, and is distinguished by one (or more) of the following cognitive disturbances: aphasia, apraxia, agnosia, or disturbance in executive functioning (i.e., planning, organizing, sequencing, abstracting). These cognitive limitations have broad and major implications for occupational and social interaction, as well as safety. The declines associated with Alzheimer's disease are progressive and irreversible. Definitive diagnosis is possible only on autopsy, but diagnosis is made in the absence of alternatives (for example, brain tumor and other neurological conditions or diseases). Several tools are available to assess cognitive function, and the common element of most is the assessment of memory function. For further information and reference, the DSM-IV is available on the following Web site: http://www.psychologynet.org.

For nurses, assessing cognitive function is a challenging task because of the combination of factors that may be interacting: age-related changes, diseases associated with aging, heredity, and lifestyle. Added to this is the concern that for older adults and their families, even the suspicion of Alzheimer's disease can be a frightening and discouraging experience. In recent years, however, several medications have been

developed that claim to slow the progress of the disease, with mixed findings.

A relatively new area of assessment of older adults with progressive dementia is that of "social ability." Social abilities include giving and receiving attention, participating in conversation, recognizing social stimuli, appreciating humor, and being helpful to others (Baum, Edwards, & Morrow-Howell, 1993; Dawson, Wells, & Kline, 1993; Sabat & Collins, 1999). Dawson and her colleagues (1993) have developed and validated a social abilities assessment subscale that can be used as a basis for supporting and maintaining ability in social life as much as possible. The entire tool (Abilities Assessment for the Nursing Care of Persons with Alzheimer's Disease and Related Disorders) is available in the document "Caregiving Strategies for Older Adults with Delirium, Dementia and Depression" on the following Web site: http://www.rnao.org.

Box 7-5 Recommended Readings

Burns, A., Lawlor, B., & Craig, S. (2004). *Assessment scales in old age psychiatry*, (2nd ed.). London: Martin Dunitz.

Lassey, W. R., & Lassey, M. L. (2001). *Quality of life for older people*. Upper Saddle River, NJ: Prentice-Hall.

Gallo, J. J., Fulmer, T., Paveza, G., & Bogner, H. R. (2005). *Handbook of geriatric assessment*. Boston: Jones & Bartlett Publishers.

Psychological Assessment

Psychological assessment of older adults presents a wide continuum from positive mental health to mental health problems, and the tendency seems to be weighted toward assessment of mental health disorders. In this chapter we will be looking at two areas of psychological assessment: quality of life, which may include several positive mental health constructs, and depression, a common mental health problem.

Quality of Life

Quality of life and successful aging are two central concepts in assessment and care of older adults. Broadly speaking, quality of life encompasses all areas of everyday life: environmental and material components, and physical, mental, and social well-being (Fletcher, Dickinson, & Philp, 1992). Quality of life among older adults is highly individualistic, subjective, and multidimensional in scope. With respect to what constitutes quality of life, what is important to one person may be quite unimportant to another. Related to quality of life is the concept of successful aging. Long associated with community living, successful aging has traditionally been linked with physical health, independence, functional ability, and longevity. However, other elements such as engagement in social life, self-mastery, optimism, personal meaning in life, and attainment of goals have been suggested as vital to the idea of successful aging (Reker, Peacock, & Wong, 1987; Rowe & Kahn, 1997). Elements of successful aging have included self-acceptance, positive relationships with others, and personal growth. A broad conceptualization of successful aging means broad applicability of the concept to older adults with various abilities and disabilities. If we can go beyond the idea of physical health as the primary criterion for successful aging, then we can remove the labelling of frail older adults as being "unsuccessful" in their aging (Guse & Masesar, 1999).

Assessment of quality of life and successful aging can assist in better understanding the psychological health of older adults. Simply put, the following assessment questions will open dialogue on attitude, beliefs, and feelings about aging and mental health. For example, the nurse can ask, "How would you describe your quality of life?" and "What would add to your quality of life?" Questions on successful aging are also informative. For example, "Would you describe yourself as someone who is aging successfully?" and "What would help you to age successfully?"

Depression

Clinical depression is the most common mental health problem among older adults, and it often goes undetected because clinicians attribute depressive symptoms to age-associated changes, chronic physical illness, medication side effects, or pain. The consequences of depression can be serious. The prevalence of clinical depression in older Americans is estimated to be from 5%–10% among community-dwelling individuals, 30%–40% among recently hospitalized individuals, and 15%–30% among older persons residing in long-term care facilities (Lebowitz et al., 1997). Older Americans may experience depressive symptoms but not meet the established criteria for clinical depression as outlined in the DSM-IV. To meet the DSM-IV criteria, an older adult must experience five or more of the following symptoms during a 2-week period (American Psychiatric Association, 2000):

- Sadness
- Lack of enjoyment of previously enjoyed activities
- Significant weight loss
- Sleep disturbance
- Restlessness
- Fatigue
- Feelings of worthlessness
- Impaired ability to think clearly or concentrate
- Suicide ideation or attempt

Depressed older adults may experience difficulty with sleeping, loss of appetite, physical discomfort, anxiety, hopelessness, bouts of crying, and suicide ideation. They may feel uncomfortable in social situations and curtail their usual social contacts and events, creating a downward spiral of depression and isolation. Depression is associated with cognitive limitations, and depressed older adults can experience disorientation, shortened attention span, emotional outbursts, and difficulty in intellectual functioning. The criteria for clinical depression are standardized and available on the following Web site: http://www.psychologynet.org.

The Geriatric Depression Scale (GDS) is an excellent tool (available online through www.geronurseonline.com) to evaluate depression. The interviewer asks the older person a set of 30 questions. A score of 0–30 is possible, with 0–9 being normal, 10–19 indicating mild depression, and 20–30 indicating severe depressive symptoms.

Clinical depression may be chronic or have a shorter duration, and it is not the same as experiencing temporary feelings of unhappiness, confused thinking, and somatic complaints. Nurses are in a good position, whether it be in community, acute care, or long-term care practice, to screen for potential depression (Bruno & Ahrens, 2003). A recent study found that questions asking about functional ability decline, visual impairment, memory impairment, and using three or more medications provided a reasonably good screen for depressive symptoms and consequential health service utilization (Dendukuri, McCusker,

& Belzile, 2004). Even asking the question, "Do you often feel sad or depressed?" is likely to open discussion and lead to further assessment of feelings of depression (Mahoney et al., 1994).

Social Assessment

Social functioning affects health, and health status affects the ability to socialize and interact with others. As people age, they may find that their social networks become smaller and this may place them at risk in several ways. Decades of research have told us that individuals with low quantity and quality of social relationships have a higher morbidity and mortality risk compared with those who have a good quantity and quality of social contacts. A supportive social network and in particular the presence of a spouse can act to maintain an older adult in the community; the lack of a partner is a predictor of institutionalization.

Social assessment of older adults includes collecting information on the presence of a social network and on the interaction between the older adult and family, friends, neighbors, and community. Kane, Ouslander, and Arass (1989) developed a broad-based social assessment that includes asking questions about recent life events

Box 7-6 Resource List

Hospital Elder Life Program (http://elderlife.med.yale.edu): The Hospital Elder Life Program (HELP) is a patient-care program, developed by doctors and nurses at the Yale School of Medicine, that is designed to prevent delirium among hospitalized older patients.

The John A. Hartford Foundation Institute for Geriatric Nursing (http://www.hartfordign.org and www.geronurseonline.com): These Web sites offer links to several assessment tools including SPICES (an overall assessment tool), Fall Risk Assessment, and the Geriatric Depression Scale.

National Institute for Health and Clinical Excellence (NICE) (http://www.nice.org.uk): This agency is an excellence-in-practice organization responsible for providing national guidance on the promotion of good health and the prevention and treatment of ill health in the United Kingdom. The Web site offers assessment and prevention tools in relation to falls and older adults.

Registered Nurses Association of Ontario (http://www.rnao.org/bestpractices): This is the professional association of registered nurses in Ontario, Canada. It provides several best practices including assessment guidelines, for example, in the areas of pain, stage I to IV pressure ulcers, foot ulcers for people with diabetes, and screening for delirium, dementia, and depression in older adults.

(such as death of a spouse), living arrangements, everyday activities requiring help (and who usually provides help), potential isolation (frequency of leaving the house and having visitors), adequacy of income, and sources of health care coverage.

Having a social network does not necessarily mean that there are social supports. However, the Lubben Social Network Scale contains 10 items, 3 of which have been found to differentiate those who are isolated from those who are not (Kane, 1995). These questions are:

- Is there any one special person you could call or contact if you needed help?
- In general, other than your children, how many relatives do you feel close to and have contact with at least once a month?
- In general, how many friends do you feel close to and have contact with at least once a month?

The more important aspects of social support may be the number of supportive persons and the various types of support (emotional, instrumental, and informational) that are available. Seeman and Berkman (1988) have identified four questions that assess the adequacy of social support. These questions are:

- When you need help, can you count on anyone for house cleaning, groceries, or a ride?
- Could you use more help with daily tasks?
- Can you count on anyone for emotional support (talking over problems or helping you make a decision)?
- Could you use more emotional help (receiving sufficient support)?

Using these kinds of questions will help assess the adequacy and range of support available to an older adult.

Spiritual Assessment

Spiritual assessment is an integral part of comprehensive assessment and provides a basis for an individualized plan of care (Forbes, 1994). Although there is a link between religiosity and spirituality, the two concepts are not synonymous. Religiosity refers to believing in God, organized rituals, and specific dogma; spirituality refers to broader ideas of belief that encompass personal philosophy and an understanding of meaning and purpose in life. Having religious beliefs may foster spirituality, but those without formal religious beliefs still can experience spirituality. Most health service intake forms have a place for collecting information on formal religious affiliation, but this does not necessary mean that the older adult is practicing his or her faith, or is active in a place of worship.

One of the earliest guidelines for spiritual assessment was developed by Stoll (1979), and it contains questions that address both religiosity and spirituality. The guidelines are divided into four areas:

1. The concept of God or deity (for example, "Is religion or God significant to you?")
2. Personal source of strength and hope (for example, "What is your source of strength and hope?")
3. Significance of religious practices and rituals (for example, "Are there any religious practices that are important to you?")

4. Perceived relationship between spiritual belief and health (for example, "Has being sick made any difference in your feelings about God or the practice of your faith?")

Nurses may not be comfortable conducting a spiritual assessment because it may seem inappropriately invasive or because it is an area that some nurses do not feel adequately prepared to address as an unmet need. If the intake record indicates a formal religious affiliation, then it is fairly straightforward to ask, "Do you have any religious needs?" or "Would you like to speak with a pastoral care worker?" Questions that address spirituality can begin by asking, "Are you having a spiritual need? Is there some way that I might help with your spiritual needs?" Another spiritual assessment question asks, "Have your health problems affected your feelings of meaning or purpose?" Several helpful tools are presented in Chapter 22. Spiritual assessment is an area that would benefit greatly from more research.

Other Assessment: Overweight and Obesity

Overweight and obesity have become a major health problem among Americans, including older Americans. Given the obesity prevalence in middle-aged adults, the proportions and numbers of obese older adults is expected to increase substantially over the next decade (Arterburn, Crane, & Sullivan, 2004). In 1998, the National Institutes of Health released the first federal overweight and obesity guidelines, which are based on the body mass index (BMI), a ratio of weight (in pounds) to height (in inches squared), as an assessment tool. The BMI is a number usually between 16 and 40. A BMI between 25 and 29 is considered "overweight" and more than 30 is considered "obese." For instructions on how to calculate a BMI, go to the Centers for Disease Control Web site: www.cdc.gov/nccdphp/dnpa/bmi/bmi-adult.htm.

The adverse effects of obesity in relation to cardiovascular disease, diabetes, osteoarthritis, and gallbladder disease are well documented. Obese older adults are likely to experience balance and mobility problems that place them at risk for falls. One study reported obesity as being a risk factor for decline in functional ability (as assessed by needing assistance with ADLs and IADLs) (Jensen & Friedmann, 2002). Unfortunately, there has been little research conducted on obese older adults, and this remains an area for further research and tool refinement. It is not clear whether the markers for overweight and obesity are relevant to older adults who may experience illness-related weight gain or loss. It has been suggested that for many older adults, an emphasis on weight maintenance might be the best approach until more evidence is accumulated through research (Jensen & Friedmann, 2002).

Nurses can assess for overweight and obesity using the BMI and by asking about a history of weight change. If food intake is a concern, a common approach is to begin with a 3- to 7-day meal diary. This information can assist in determining a person's food habits.

Developing an Individualized Plan of Care

At the beginning of this chapter, we indicated that the basis of an individualized plan of care

for an older adult is a comprehensive assessment, and we have reviewed functional, physical, cognitive, psychological, social, and spiritual assessment. In **Box 7-7**, we provide 10 guidelines for comprehensive assessment that form a basis with which to develop an individualized plan of care. Additionally **Table 7-1** provides a summary of the quality assessment tools recommended as best practices by the John A. Hartford Foundation and Nurse Competence in Aging initiative (available online at www.geronurseonline.org).

Box 7-7 Ten Principles of Comprehensive Assessment

1. The cornerstone of an individualized plan of care for an older adult is a comprehensive assessment.
2. Comprehensive assessment takes into account age-related changes, age-associated diseases, heredity, and lifestyle.
3. Nurses are members of the health care team, contributing to and drawing from the team to enhance the assessment process.
4. Comprehensive assessment is not a neutral process.
5. Ideally, the older adult is the best source of information to assess his or her health. When this is not possible, family members or caregivers are acceptable as secondary sources of information. When the older adult cannot self-report, physical performance measures may provide additional information.
6. Comprehensive assessment should first emphasize ability and then should address disability. Appropriate interventions to maintain and enhance ability and to improve or compensate for disability should follow from a comprehensive assessment.
7. Task performance and task capacity are two difference perspectives. Some assessment tools ask "Do you dress without help?' (performance) whereas others ask, "Can you dress without help?" (capacity). Asking about capacity will result in answers that emphasize ability.
8. Assessment of older adults who have cognitive limitations may require task segmentation, or the breaking down of tasks into smaller steps.
9. Some assessment tools or parts of assessment tools may be more or less applicable depending on the setting, that is, community, acute care, or long-term care settings.
10. In comprehensive assessment, it is important to explore the meaning and implications of health status from the older adult's perspective. For example, the same changes in visual acuity for two older adults may have quite different meanings and implications for everyday life.

Table 7-1 Assessment Tools Available through the Try This Series via www.geronurseonline.com (2005)

- SPICES: An Overall Assessment Tool of Older Adults
- Katz Index of Independence in Activities of Daily Living (ADL)
- The Mini Mental State Examination (MMSE)
- The Geriatric Depression Scale (GDS)
- Predicting Pressure Ulcer Risk
- The Pittsburgh Sleep Quality Index (PSQI)
- Assessing Pain in Older Adults
- Fall Risk Assessment
- Assessing Nutrition in Older Adults
- Sexuality Assessment
- Urinary Incontinence Assessment
- Hearing Screening
- Confusion Assessment Method (CAM)
- Caregiver Strain Index (CSI)
- Elder Abuse and Neglect Assessment
- Beers' Criteria for Potentially Inappropriate Medication Use in the Elderly
- Alcohol Use Screening and Assessment
- The Geriatric Oral Health Assessment Index (GOHAI)
- Horowitz's Impact of Event Scale: An Assessment of Post Traumatic Stress in Older Adults
- Preventing Aspiration in Older Adults with Dysphagia
- Immunizations for the Older Adult
- Avoiding Restraints in Patients with Dementia
- Brief Evaluation of Executive Dysfunction: An Essential Refinement in the Assessment of Cognitive Impairment
- Assessing Pain in Persons with Dementia
- Therapeutic Activity Kits
- Recognition of Dementia in Hospitalized Older Adults
- Wandering in the Hospitalized Older Adult
- Communication Difficulties: Assessment and Interventions
- Assessing and Managing Delirium in Persons with Dementia
- Decision Making and Dementia

Critical Thinking Exercises

1. In this chapter, we have said that comprehensive assessment is not a neutral process. Reflect on what that really means and what kinds of things might constitute an unwanted bias to the assessment process.
2. In this chapter, we have emphasized that comprehensive assessment makes use of nursing knowledge and understanding of the combined factors of age-related changes, age-associated diseases, heredity, and lifestyle choices. Think of an older adult for whom you have provided care and, without using names, describe that person and try to outline the factors (age-related changes, age-associated diseases, heredity, and lifestyle choices) that are relevant for his or her health assessment.

Personal Reflections

1. In this chapter, we have underlined the importance of the health care team and consultation with team members. Reflect on your understanding of the contributions of team members in relation to assessment of older adults. What are some of your personal attributes in terms of working as a member of the health care team?
2. How would you define "successful aging" in relation to your own aging? What are the implications of your definition in relation to decisions you might make during your lifetime? How might this definition affect the way you view the aging process of others?

Glossary

Agnosia: Loss of ability to understand auditory, visual, or other sensations

Aphasia: Impaired ability to communicate

Apraxia: Inability to perform purposeful movements

Cataracts: A clouding of the lens of the eye, its capsule, or both

Cerumen: Ear wax

Dysphagia: Difficulty in swallowing

Functional incontinence: The genitourinary tract is functioning and incontinence is due to immobility or cognitive limitations

Glaucoma: An eye disease of increased intraocular pressure that can lead to blindness if not treated

Ketones: Acetone bodies in the urine indicating inadequate management of diabetes mellitus

Longevity: A long life

Macular degeneration: Loss of central vision, associated with aging

Osteoarthritis: Deterioration of joints and vertebrae as a consequence of wear and tear

Osteoporosis: Reduction in bone mass leading to thin, weak bones

Otosclerosis: Damage to the inner ear of unknown cause that leads to progressive deafness

Overflow incontinence: Incontinence that occurs because the bladder has not been emptied and it has become overdistended

Polydipsia: Excessive thirst

Polyphagia: Excessive eating

Polyuria: Excessive urination

Presbycusis: Age-related progressive loss of hearing

Presbyopia: Age-related loss of elasticity of the lens of the eye

Stress incontinence: Leaking of urine occurs during activities that increase abdominal pressure, for example, laughing, sneezing, and exercising

Urge incontinence: Incontinence occurs because of an inability to delay urination

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Chapter 8

Medications and Laboratory Values

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LEARNING OBJECTIVES

At the end of this chapter, the reader will be able to:

1. Discuss demographics related to aging and medication use.
2. Identify the effect of aging on drug metabolism.
3. Describe common drug-related problems in the elderly.
4. List medications that may be inappropriate for older adults.
5. Distinguish the relationship between laboratory values and medication administration.
6. Review the nurse's role in the older adult's adherence to a medication regimen.
7. Critically evaluate selected case studies related to older adults and medication.
8. Describe medications used for three common conditions in the elderly population.

KEY TERMS

- Absorption
- Activities of daily living
- Adverse drug reaction (ADR)
- Compliance
- Distribution
- Drug–disease interaction
- Drug–drug interaction
- Excretion
- Food–drug interactions
- Function
- Instrumental activities of daily living
- Metabolism
- Peak blood level
- Pharmacodynamics
- Pharmacokinetics
- Polypharmacy
- Random blood level
- Trough blood level

Assisting the older adult with medications requires much more than pouring and administering the drugs. The nurse must have basic knowledge about the indications for the medication, correct dosages, correct administration, anticipated side effects, potential adverse drug reactions, and contraindications for each medication. The nurse must also, however, have knowledge of the unique biopsychosocial aspects of medication administration in the elderly. These include knowing how aging affects the metabolism of medications ("bio"), being aware of psychological influences on adherence to medication regimens, and the social aspects that are integral to a successful outcome. This chapter will review the biopsychosocial aspects of medication administration, while stressing the influence of the nurse on successful medication outcomes.

Demographics

Today, the geriatric population (persons > 65) makes up about 13% of the general population. That number is expected to increase to greater than 20% by the year 2040. Elderly patients, however, consume about 33% of all prescription medications and over-the-counter drugs (Delafuente & Stewart, 2001). Overall, the elderly have more disease states than other populations and therefore require the use of more medications. Thus, effective and safe drug therapy is one of the greatest challenges within the elderly population. One national survey of noninstitutionalized persons, published in 2002, found that 40% of adults aged greater than 65 years used 5 or more different medications per week and 12% used 10 or more different medications. Also, these persons randomly filled additional prescriptions when acute medical conditions arose, such as infections or pain. Elderly persons who reside in nursing homes and assisted living facilities typically use even more medications (Beers & Berkow, 2000).

The Effects of Aging on Drugs

Normal aging is associated with certain physiological changes that can significantly influence drug response. Both **pharmacokinetics** and **pharmacodynamics** play a role in how a person will respond to a drug.

Pharmacokinetics

Pharmacokinetics is the time course by which the body absorbs, distributes, metabolizes, and excretes drugs (Beers & Berkow, 2000). In other words, pharmacokinetics speaks to how drugs move through the body and how quickly this occurs.

Absorption is defined as the movement of the drug from the site of administration, across biological barriers, into the plasma. Although the rate of drug movement through the body may decrease with age, the extent of drug absorption is least affected by age. Certain disease states, however, and the simultaneous use of several medications has been shown to decrease absorption of some medications (California Registry, 2004).

Distribution is the movement of the drug from the plasma into the cells. As patients age, total body water declines and fat stores increase. This physiological change affects the distribution phase of highly water-soluble and fat-soluble drugs. Therefore, the volume of distribution may be decreased for drugs that are highly water soluble and increased for drugs that are highly

lipid soluble. For example, diazepam (Valium) is a highly lipid-soluble medication. Diazepam has a documented long half-life in a young adult (the time it takes for half of the drug taken to be metabolized), but in an elderly person the half-life is even longer due to the increase in the fat stores. For the elderly patient who may be more sensitive to the side effects of diazepam, the longer half-life may cause prolonged adverse effects.

With age, hepatic mass and hepatic blood flow decrease (Beers & Berkow, 2000). Therefore, the hepatic **metabolism** of medications is reduced. Also with age, the renal mass and renal blood flow are reduced. This physiological change will decrease the amount of drug that goes through renal **excretion.** This can result in higher, and potentially toxic, levels of drug in the body of the older adult, compared to the same dosage administered to a younger person. Because renal function tends to decline with age, drug doses should be reviewed and adjusted periodically in all elderly patients.

Pharmacodynamics

Pharmacodynamics is the time course and effect of drugs on cellular and organ function. In other words, pharmacodynamics is what the drugs do once they're in the body.

The effects of similar drug concentrations at the site of action may be greater or less than those in younger patients. Therefore, the potential for increased sensitivity to medications at the cellular level must be considered when administering them to an elderly patient. For instance, in the elderly person, an increased receptor response is seen for benzodiazepines, opiates, and warfarin (Coumadin). This results in benzodiazepines producing increased sedation, opiates increasing analgesia and respiratory suppression, and warfarin producing an increased anticoagulant effect (California Registry, 2004).

Drug-Related Problems in the Elderly

About one third of drug-related hospitalizations occur in persons over 65 years old (Beers & Berkow, 2000). Even though medications provide benefit by preventing and treating disease, older people are more susceptible to drug-related problems, including **adverse drug reactions (ADRs)**, food–drug interactions, polypharmacy, inappropriate prescribing, and noncompliance.

Adverse Drug Reactions

The World Health Organization defines ADRs as "any noxious, unintended, and undesired effect of a drug, which occurs at doses used in humans for prophylaxis, diagnosis, or therapy" (Delafuente & Stewart, 2001, p. 289). Two different types of ADRs are **drug–drug interactions** and **drug–disease interactions**. Drug–drug interactions can be defined as the alteration of the pharmacokinetics or pharmacodynamics of drug A when taken at the same time as drug B. Drug–disease interactions are defined as the worsening of a disease by a medication (**see Table 8-1**).

Older patients, with multiple disease states, often consume many different medications to treat both acute and chronic medical conditions. As a result, ADRs occur often in older patients. Age-related alterations in drug distribution, hepatic metabolism, and renal clearance all play a significant role in the chances of an elderly patient developing an ADR. ADRs in elderly patients may decrease functional status, increase

Table 8-1 DRUG–DISEASE INTERACTIONS IN THE ELDERLY

Disease	Drugs	Adverse Reactions
Benign prostatic hyperplasia	Anticholinergics	Urinary retention
Chronic obstructive pulmonary disease	β-blockers, opioids	Bronchoconstriction, respiratory depression
Dementia	Anticholinergics, opioids	Increased confusion, delirium
Depression	Alcohol, β-blockers, centrally acting antihypertensives, corticosteroids	Precipitation or exacerbation of depression
Diabetes	Corticosteroids	Hyperglycemia
Glaucoma	Anticholinergics	Exacerbation of glaucoma
Hypertension	NSAIDs	Increased blood pressure
Hypokalemia	Digoxin	Cardiac arrhythmias
Hyponatremia	Oral hypoglycemics, diuretics, carbamazepine, SSRIs	Decreased sodium concentration
Orthostatic	Diuretics, tricyclic antidepressants, vasodilators	Dizziness, falls, syncope, hip fracture
Osteopenia	Corticosteroids	Fracture
Parkinson's disease	Antipsychotics	Worsening movement disorder
Peptic ulcer disease	Anticoagulants, NSAIDs	Upper gastrointestinal bleeding
Peripheral vascular disease	β-blockers	Intermittent claudication
Renal impairment	Aminoglycosides, NSAIDs	Acute renal failure

Aminoglycosides (e.g., gentamicin)
Anticoagulants (e.g., warfarin)
β-blockers (e.g., metoprolol)
Centrally acting antihypertensives (e.g., clonidine)
Corticosteroids (e.g., prednisone)
NSAIDs = nonsteroidal anti-inflammatory drugs (e.g., ibuprofen)
Opioids = narcotic medications (e.g., morphine)
SSRIs = selective serotonin uptake inhibitors (e.g., paroxetine)
Tricyclic antidepressants (e.g., amitriptyline)

Source: Beers & Berkow, 2000.

health services use, and in some rare cases have resulted in death. Overall, ADRs represent a major problem for elderly patients. In addition to better prescribing patterns from the physicians, there's a need for nurses and pharmacists to increase medication monitoring.

Food–Drug Interactions

Undetected **food–drug interactions** may lead to serious morbidity and mortality in the older adult. The effect of certain foods on drugs metabolized by the CYP450 families and on

drugs susceptible to chelation and absorption has recently been recognized. Foods may contain compounds that lead to failure of an intended drug effect; alternately, malnutrition can lead to poor metabolism of drugs (McCabe, 2004).

The presence or absence of food may reduce or increase the bioavailability of a medication, leading to unanticipated effects. The first "lethal" food–drug interaction recognized was that of cheese and monoamine oxidase inhibitors (MAOIs). The interaction of food and drug in this instance could lead to extremely high blood pressure and stroke. Grapefruit juice is known to interact with antihistamines, and greens with warfarin. Herbal and dietary supplements may interact with medications, affecting metabolism of the drug. Natural licorice may induce hypertension and interfere with certain drugs. Antibiotics may be susceptible to chelation and absorption by fortified cereals, calcium-fortified orange juice, or protein beverages. These interactions reduce the efficacy of the antibiotic and may lead to antibiotic-resistant bacteria (McCabe, 2004).

Malnutrition can also affect the metabolism of medications. Gut integrity is necessary for drug metabolism; the patient who goes without food for several days may change the integrity of the gut and thus negatively impact drug metabolism and absorption. Patients receiving nutritional supplementation are at increased risk for drug-induced nutritional problems. Medications can also cause malnutrition. Chemotherapeutic agents may change appetite, cause nausea and vomiting, and affect the intestinal mucosa. Anticonvulsants can create marginal nutrient states in older adults. Diuretics affect the fluid and electrolyte balance. And excessive, chronic alcohol intake can lead to poor nutritional intake and changes in drug metabolism (McCabe, 2004).

Polypharmacy

Many older patients are prescribed multiple drugs, take over-the-counter medications, and are often prescribed additional drugs to treat the side effects of the medications that they are already taking. The increase in the number of medications often leads to **polypharmacy**, which is defined as the prescription, administration, or use of more medications than are clinically indicated in a given patient. Potential adverse outcomes of polypharmacy include adverse drug reactions, increased cost, and noncompliance. See **Case Study 8-1**.

Several interventions that may help the prescriber to prevent polypharmacy include knowing all medications, by both brand and generic name, being used by the patient; identifying indications for each medication; knowing the side effect profiles of the medications; eliminating drugs with no benefit or indication; and avoiding the urge to treat a drug reaction with another drug. Patient education on the risks of polypharmacy may help the patient as well.

The nurse plays a key role in screening for polypharmacy. When determining if a medication is appropriate for a patient, the nurse should ask the following questions:

- Is the medication necessary? For example, does the patient have a medical problem for every medication ordered?
- Do the risks outweigh the benefits? If there's a potential for an ADR, will the benefit of administering the medication outweigh the risk of the ADR? One example might be examining the benefit of administering vancomycin (Vancocin) to a renally impaired elderly patient who has methacillin-resistant staphylococcus aureus (MRSA) and who

Case Study 8-1

Ms. Espinoza is a 90-year-old Hispanic female admitted to the hospital from her assisted living facility. She has a history of hypertension and dementia, and had a stroke and a myocardial infarction 3 years ago. She has also had insomnia for the past month. Ms. Espinoza is admitted due to an alteration in her mental status. She has had a cold and a cough for a week, for which she took Coricidin (acetaminophen and chlorpheniramine) and Tylenol PM (acetaminophen and diphenhydramine). Her home medications include monthly Nascobal (vitamin B_{12}) injections; Toprol-XL (metoprolol succinate), 100 mg daily; Plendil (felodipine), 10 mg daily; Allegra (fexofenadine), 180 mg daily; Ecotrin (aspirin EC), 325 mg daily; and Colace (docusate sodium), 100 mg daily. She also has a very unsteady gait.

Ms. Espinoza's admitting diagnosis is pneumonia. The physicians order the following medications: Lasix (furosemide), 20 mg IV push, x1; Pepcid (famotidine), 20 mg bid; Ecotrin (aspirin EC), 325 mg daily; Toprol-XL (metoprolol succinate), 100 mg daily; Colace (docusate sodium), 100 mg daily; Allegra (fexofenadine), 180 mg daily; Levoquin (levofloxacin), 250 mg daily IVPB; Plendil (felodipine), 10 mg po daily; and Ambien (zolpidem), 5 mg at bedtime as needed.

Questions

1. Which medication(s) may have contributed to Ms. Espinoza's altered mental status?
2. In addition to the drug regimen, does Ms. Espinoza have any other risk factors for altered mental status?
3. Would you alter her drug regimen in any way? If so, how?

is resistant to all other antibiotics. In this case, the benefits of the medication probably outweigh the risks to the kidney, as long as renal function is carefully monitored and dosage is adjusted according to renal function as well as peak and trough levels.

- Is the frequency of the medication prescribed appropriately? For instance, sustained-release morphine (MS Contin) can be ordered every 12–24 hours whereas immediate-release morphine (MSIR) is ordered more frequently.
- Is the medication prescribed in the most appropriate dose, route, and/or form? Some elderly patients have difficulty swallowing; therefore, other dosage forms such as suppositories or topical patches may be more appropriate. See **Table 8-2** for a quick summary of this topic.

Table 8-2 Questions to Ask to Avoid Inappropriate Prescribing for Elderly Patients

- Is the treatment necessary?
- Is this the safest drug available?
- Is this the most appropriate dose, route of administration, and dosage form?
- Is the frequency appropriate?
- Do the benefits outweigh this risk?

Source: The Merck Manual of Geriatrics (3rd ed., pp. 54–74), edited by Mark H. Beers and Robert Berkow. Copyright 2000 by Merck & Co., Inc., Whitehouse Station, NJ.

Inappropriate Prescribing

Overall there is no generalized rule for prescribing drugs to the geriatric population. There are numerous studies that indicate that some prescribing patterns in the elderly population are inappropriate, such as no indications for use of a drug, inappropriate frequency of medications, inadequate dosages, and the possibility of drug interactions or ADRs. Goulding (2004) found that, between 1995 and 2000, at least one inappropriate drug was administered to 7.8% of the elderly patients in her study. Also, at least one drug classified as "never or rarely appropriate" was prescribed to between 3.7% and 3.8% of patients. A large share of the inappropriate drugs in this study was pain medications and central nervous system drugs. The odds that female patients were being prescribed inappropriate medications were double that of males.

One example of the potential effects of inappropriate prescribing was described by Wagner et al. (2002). This research team analyzed the Medicaid claims data for a 42-month period in New Jersey. After statistical adjustment for age, sex, race, nursing home residence, exposure to "other" medications, diagnosis of epilepsy and dementia, and hospitalization in the last 6 months, the incidence of hip fracture was significantly higher in persons who took benzodiazepines. Not only were hip fractures associated with benzodiazepine use, short half-life benzodiazepines were not safer than long half-life benzodiazepines. Hip fracture risk was highest in the first 2 weeks after starting a benzodiazepine. Kudoh and colleagues (2004) found that long-term elderly users of benzodiazepines increased their risk of postoperative confusion, as well.

Compliance

Although age alone does not affect **compliance**, about 40% of elderly persons do not adhere to their medication regimen (Beers & Berkow, 2000, p. 69). The more complex the medication regimen, the less likely the patient will comply. For elderly patients, nonadherence may result from the patient trying to avoid side effects and therefore reduce the amount of drug consumed, lack of money, or forgetfulness (early dementia). Seniors may simply not be taking the medications they need because they cannot afford them. Compliance can be encouraged by establishing a good relationship with the patient, providing education about possible side effects, providing clear instructions for how the medication should be taken, encouraging questions from the patient, and providing home nursing support as needed.

Case Study 8-2

Mrs. Tyler is an 84-year-old white female with a past medical history of breast cancer, mastectomy, dementia, osteoporosis, depression, and a right hip fracture and repair 1 month ago. She also has a history of anxiety. Her home medications include Prozac (fluoxetine hydrochloride), 20 mg qd; Os-Cal (calcium carbonate), 500 mg tid; Aricept (donepezil hydrochloride), 10 mg qd; Zantac (ranitidine), 150 mg; Ecotrin (aspirin EC), 81 mg qd; Mellaril (thioridazine HCl), 10 mg qd; and Valium (diazepam), 10 mg at bedtime daily. She has no known drug allergies.

Mrs. Tyler was admitted to the emergency room after a fall at her assisted living facility. She suffered a fractured left hip. She was admitted to your nursing unit with the new fracture and constipation. Medications ordered on admission included: normal saline IV at 75 cc hour; Hep-Lock (heparin), 5,000 mg sq q 12 hours; MSIR (morphine), 2 mg IV push q 3–4 hrs prn pain; MS SR, 15 mg po bid; Oscal (calcium carbonate), 500 mg po tid; Mellaril (thioridazine HCl), 10 mg qd; Protonix (pantoprazole), 40 mg qd; Aricept (donepazil HCl), 5 mg qd; and Prozac (fluoxetine), 20 mg po qd. Fleet (sodium phosphate) enema × 2 and Citro-Mag (magnesium citrate) 150 ml x 1 were ordered to treat the constipation. Protonix (pantoprazole sodium), 40 mg qd, was also ordered for GI prophylaxis.

Postoperatively, Mrs. Tyler was put on Demerol (meperidine) per PCA pump, with promethazine as needed. Three days later, she presented with altered mental status and hallucinations. Her urine and blood cultures were negative for infection. The daughter states that Mrs. Tyler has never acted like this before and that she is very concerned about her mother's condition.

Questions

1. What home medications may have contributed to Mrs. Tyler's fall?
2. What symptoms does Mrs. Tyler display that may be drug related?
3. Would you alter Mrs. Tyler's hospital drug regimen in any way?

Potentially Inappropriate Medications for Geriatric Patients

There is a benefit/risk relationship with the consumption of any medication. The benefit of medication use is to provide positive outcomes; the risk may include unwarranted side effects. There are several medications available on the market that provide excellent results but are not ideal for use in elderly patients. Although some medications cannot be avoided entirely due to the disease state, one should be aware of the pos-

sible side effects, especially when administering medications to an elderly patient who often has multiple comorbidities.

The Beers Criteria for Potentially Inappropriate Medication Use in the Elderly (Beers, 1997; Fick et al., 2003) is widely recognized as the standard of care for medication prescription. A panel of experts identified medications that have potential risks that would outweigh the benefits of the medication in the older adult population (Hartford Institute, n.d.). See **Case Study 8-2**.

If any of these medications are administered, the lowest and most effective dose should be started first, then titrated slowly upward until the desired effect is obtained. Remember the saying "Start low and go slow." This strategy will help to prevent ADRs that may prolong a hospital stay, lead to a hospitalization, and even cause harm to the patient and others.

Laboratory Values

Due to physiologic changes, laboratory results for older adults may differ from those of younger adults; that is, the reference ranges or "normals" may be different. Other variables may also affect the laboratory results obtained. For instance, leaving the tourniquet in place too long can cause an elevation in the results of a cholesterol test, as may exercise or position changes immediately before the blood is drawn. Or, the amount of anticoagulant in a vacutainer tube may vary, influencing the results. Results from venous and capillary sites can vary within the same individual. The same person may also vary in results over time, simply due to normal biologic events. And the normal aging process can cause variations in normals for the older population. For example, normal changes with aging occur in serum chemistry (alkaline phosphatase, serum albumin, serum magnesium, and uric acid), lipids (total and HDL cholesterol, triglycerides), blood glucose (fasting, 1- and 2-hour postprandial), renal (creatinine clearance), thyroid (T4 and TSH), and hematology (leukocyte count, erythrocyte sedimentation rate, and vitamin B_{12} (Brigden & Heathcote, 2000).

Laboratory values and medication administration go hand in hand. Laboratory work may be done to:

- Monitor compliance with medication administration
- Check for therapeutic or toxic levels of medication in the blood
- Evaluate the body's ability to metabolize medications
- Evaluate the need for medications to treat a condition

Whatever the case, it is important that the nurse be aware of the relationship between laboratory values and medication administration.

Medication Blood Levels (Therapeutic Blood Levels)

The amount of medication circulating in the blood can be monitored for some medications. This may include monitoring for blood levels of medications taken on a routine basis or in an emergency situation where drug overdose is suspected. Some medications commonly monitored in the elderly include cardiac medications, antiepileptics, and certain antibiotics.

The importance of measuring medication blood levels is to monitor the metabolism of the medication so that the correct dosage can be given, at the correct intervals, to obtain the best results without side effects or adverse drug reactions. Metabolism of medications may be altered in the elderly, so this concept is an important one. Some medications are toxic to the body if

the level is too high, and may be ineffective if the level is too low.

Compliance with medication administration can also be monitored through this type of testing. Key words associated with measuring the amount of circulating medications are **random, trough,** and **peak**.

RANDOM MEDICATION LEVELS

Random medication levels are not dependent upon the administration time of the medication. The blood level is drawn when the order is received. An example for this type of laboratory work might include the patient who is admitted to the emergency room with altered mental status and a drug overdose is suspected.

TROUGH MEDICATION LEVELS

Trough levels are dependent upon the administration times of the medication. The trough level is drawn at the time that the blood level is expected to be at its lowest: right before a dose is due. An abnormally high trough level indicates that the time between doses should be adjusted (lengthened); an abnormally low trough level indicates that the time between doses should be shortened. An example of this type of blood work might be the elderly patient who is receiving vancomycin (Vancocin) for an infection, in whom toxic levels must be avoided.

PEAK MEDICATION LEVELS

Peak levels are also dependent upon the time of administration. This varies according to the route of administration and for different medications. An abnormally high peak indicates that the dosage needs to be reduced; an abnormally low peak indicates that the dosage should be increased. The peak is typically drawn within a set time after a dose is given, and a trough follows right before the next dose is given. See **Table 8-3** for further information on peak and trough levels from the authors' own facility.

As you can see, it is vitally important that the nurse know the type of level to be drawn (random, peak, or trough) and then draw it at the correct time. The dosage of the drug, the frequency of administration, and the safety of the patient depend on the accuracy of the blood draw.

Toxic blood levels of medications may present in unusual ways in the older population. It is also possible that the older adult will experience side effects at levels that are not considered to be toxic in younger persons. For instance, drug toxicity from digoxin, a cardiac medication, may be evident in symptoms, although the patient's blood level is in the normal range.

Caution must always be used with the interpretation of medication level laboratory results and with dosage adjustments based on a single value. It must be ascertained that the blood was drawn as the order intended, that the preceding medications were given on time with no doses missed, and that there were no unintended drug–drug or food–drug interactions that may have affected the result. Birnbaum et al. (2003) studied a group of 56 elderly nursing home residents whose average age was 80.1 years. All received phenytoin as an antiepileptic drug. All had been on the same dose for at least 4 weeks, and all doses were given, as far as the researchers could tell. Although all of the right parameters were in place, phenytoin levels varied as much as two- to threefold for some patients, from 9.7 micrograms per ml to 28.8 mcg per ml. The authors attribute the variability to variations in hydration status and changes in gut motility.

Renal and Hepatic Function

As stated earlier, drugs are metabolized differently in the older adult. The kidneys and the

Table 8-3 Serum Levels for Selected Medications

Medication	Therapeutic Level	Peak Range	Trough Range	Toxic Levels
Serum amikacin (Amikin)		25–35 mcg/ml	3–10 mcg/ml	Peak > 35 mcg/ml Trough > 10 mcg/ml
Serum digoxin (Lanoxin)	0.8–1.6 ng/ml			>2.4 ng/ml
Serum phenytoin (Dilantin)	10–20 mcg/ml			> 20 mcg/ml
Serum gentamicin (Gentak)		2–8 mcg/ml	0.5–2.0 mcg/ml	Peak > 10 mcg/ml Trough > 2 mcg/ml
Serum quinidine (Quinaglute)	3.0–6.0 mcg/ml			> 9mcg/ml
Serum theophylline (Uniphyl)	10–20 mcg/ml			> 20 mcg/ml
Serum tobramycin (Tobrex)		5–10 mcg/ml	0.5–2.0 mcg/ml	Peak > 10 mcg/ml Trough > 2.0 mcg/ml
Serum vancomycin (Vancocin)		30–40 mcg/ml	5–10 mcg/ml	Peak > 50 mcg/ml Trough > 15 mcg/ml

Source: The Laboratory Survival Guide at http://www.utmb.edu/lsg/

liver may not function as well as in the younger person. This can affect how medications are cleared from the body and the likelihood of side effects or toxic levels of medications. Certain medications, such as aminoglycosides, nonsteroidal anti-inflammatory drugs (NSAIDs), ACE inhibitors, and IV contrast materials (used for x-rays) can also affect renal function in the elderly person (Reuben et al., 2004, p. 140). Laboratory tests that are commonly used to monitor the function of the kidneys and the liver, and to help decide the dosage and timing of medications, include the following:

- *Blood urea nitrogen (BUN):* This test is used as a gross measure of glomerular function and the production and excretion of urea (Fischbach, 1996, p. 351). Impairment of kidney function will result in an elevated BUN. The rate at which BUN rises is influenced by the degree of tissue necrosis and the rate at which the kidneys excrete urea nitrogen.
- *Creatinine:* This is a substance removed from the body by the kidneys. Measurement of the creatinine level will give a clue as to the function of the kidneys. For instance, a disorder of the kidneys will increase the level of creatinine in the blood. It is a more specific indicator of kidney disease than the BUN (Fischbach, 1996).

Health care providers commonly use the calculated creatinine clearance rate as a guide when deciding on the proper dosages of medications for older adults. This formula takes into account the patient's weight, gender, age, and renal function:

Creatinine clearance (ml/min)
= (140 − age in years)
× weight in kg/72 × serum creatinine
(for women, multiply the result by 0.85)

Manufacturers of medications affected by the creatinine clearance rate will help the provider by suggesting appropriate dosages according to the rate.

- *Alkaline phosphatase:* This is an indicator of liver disease. Levels in the blood will rise when excretion of this enzyme is impaired (Fischbach, 1996). Other indicators of liver health or disease are the alanine amino transferase (ALT), aspartate aminotransferase (AST), albumin, bilirubin, protein, and coagulation factors. See **Table 8-4** for further information about normal laboratory values.

Laboratory Values as Indicators of Need for Medications

The third connection between laboratory values and medications is when laboratory values indicate a need for medications. See **Table 8-5** for some examples of this concept.

The Role of the Nurse

The nurse has several responsibilities regarding laboratory values and medications. These include:

- Being aware of the routes of elimination of medications and the implications of aging on these routes
- Being aware of the effects of aging on the typical signs and symptoms of medication toxicity
- Maintaining knowledge of the signs of medication toxicity in the older adult
- Drawing random, peak, and trough medication levels correctly
- Knowing when to notify the prescriber of an abnormal result

Table 8-4 NORMAL LABORATORY VALUES (SERUM)

Test	Body System	Normal Levels
Blood urea nitrogen (BUN)	Renal	7–23 mg/dl
Creatinine	Renal	Male, 13 years–adult: 0.7–1.7 mg/dl Female, 13 years–adult: 0.4–1.4 mg/dl
Albumin	Hepatic	3.2–5.2 g/dl
Alkaline phosphatase	Hepatic	34–122 u/l
ALT	Hepatic	9–51 u/l
AST	Hepatic	13–38 u/l
Direct bilirubin	Hepatic	0.0–0.3 mg/dl
Indirect bilirubin	Hepatic	0.1–1.1 mg/dl
Total protein	Hepatic	6.0–8.0 g/dl

Source: The Laboratory Survival Guide at http://www.utmb.edu/lsg/

Table 8-5 SELECTED LABORATORY VALUES INDICATING A NEED FOR MEDICATION

Laboratory Test	Normal Values	Abnormal Condition	Selected Examples of Nontreatment	Potential Medications Indicated
Albumin	3.5–5.0 gm/dl	Hypoalbuminemia	Edema	Albumin
Blood culture	Negative	Positive for organisms	Infection	Antibiotics
Blood glucose	65–110	Hyperglycemia	Polyuria, polydipsia, polyphagia	Hypoglycemic agent
Hemoglobin A1C	4–6%	Chronic hyperglycemia (noncompliance)	Nonhealing wounds	Hypoglycemic agent
Prothrombin time	11–13 seconds	> 30 seconds	Bruising, bleeding	Vitamin K
Prothrombin time	11–13 seconds	< 26 seconds	Formation of blood clots in-at-risk patient	Warfarin
TSH	0.35–5.5 mIU.ml	Elevated	Primary hypothyroidism	Thyroid hormone
Uric acid	3.6–8.0 mg/dl in men, 2.9–6.0 mg/dl in women	Elevated	Pain from gout	Allopurinol
WBCs	4.5–10.5 3 103/mm3	Elevated	Untreated infection	Antibiotic

Challenges to Successful Medication Regimens for the Older Adult

For a medication to work properly, the right drug must be taken in the right amount, by the right route, at the right times, by the right patient. Failure to follow these "five rights" can delay or prevent the outcome intended by the health care provider.

The five rights are important in every setting. In the inpatient setting, such as the hospital or nursing home, the physician, the nurse, and the pharmacist ensure that the five rights are followed. In the outpatient or home setting, it ultimately becomes the patient's responsibility to ensure that they take the right medication by the right route, at the right times, in the right dose. Failure of the patient to follow these requirements is often labeled noncompliance or nonadherence to the recommendations

of the health care provider. This section will examine issues related to the older adult in the home setting.

Let's examine these five rights in more detail.

Right Drug

Assuming that the right medication is ordered by the provider and the right drug is filled by the pharmacy, there are still factors that can interfere with the patient receiving the right drug in the home setting. These might include:

- Taking medications prescribed for another person
- Keeping old medications stockpiled and forgetting which ones are currently prescribed
- Receiving prescriptions from two different providers
- Misunderstanding the use of over-the-counter medications

Right Amount

Ensuring that the right amount of drug is taken can be tricky in the home. Confounding factors might include:

- Lack of understanding of the prescribed dosage, number of pills, or amount of liquid medication
- Using teaspoons or other utensils to measure rather than measuring cups, or using the wrong size syringe
- Confusion about medication schedules
- The same prescriptions being ordered by more than one health care provider
- Forgetting which medications have already been taken

Box 8-1 Research Highlight

Aim: This survey asked what nurses felt about making and reporting medication errors.

Methods: *Nursing2002* staff surveyed nurses about their attitudes and experiences regarding medication administration and making mistakes. The analysis of the poll was based on 775 responses. The typical respondent was a 42-year-old BSN, RN with 11 years of experience working on a medical/surgical unit of a hospital.

Findings: Seventy-nine percent of nurses felt that most medication errors occurred when nurses did not follow the five rights of administration. Ninety-one percent of nurses felt that thoroughly analyzing incident reports about medication errors was an important step in future prevention of mistakes. Students were more likely to initiate an incident report for another nurse's mistake than were the nurses who worked on the units.

Conclusion: Although responses varied on a number of questions, such as the use of increased technology in medication administration and when and how to report medication errors, the majority of nurses agreed that they were responsible for assuring safe medication administration to patients and that using the five rights was important for preventing errors.

Source: Cohen, H., Robinson, E. S., & Mandrack, M. (2003). Getting to the root of medication errors: Survey results. *Nursing2003, 33*(9), 36–45.

- Failing to obtain refills
- Rationing medications so as not to run out

Right Route

Although this might be difficult to imagine, these errors do occur. Examples of failure to administer the medication by the right route might include sublingual medication that is swallowed or a suppository that is chewed.

Right Times

Taking medications at the right times can be very difficult for the older adult, for a multitude of reasons such as:

- Having medications ordered for two, three, or even four times a day
- Having multiple medications ordered, each at a different time

Right Patient

This one should not be a problem in the home, but it is. It is not unusual for patients in the home setting to "try" medications prescribed for other persons in the household. One recent example from the authors' facility is the case of a woman hospitalized for an unusually prolonged clotting time. It was finally deduced that she disliked the cholesterol medication that was prescribed for her, so she started using her husband's cholesterol pills (which he refused to take). What she didn't know was that her husband's medication was *not* alright for her, because it interacted with the warfarin she was taking for a heart condition, potentiating the anticoagulant effect and prolonging her clotting time. This type of situation is in no way unusual.

Other Issues That Interfere with Medication Administration

Other situations may interfere with the ability of the older adult to take the right medication at the right time in the right dose by the right route by the right person.

Function

Impaired **function**, or the inability to perform **activities of daily living**, can interfere with adherence to a prescribed medication regimen. For instance, a person with arthritis of the hands or paralysis of the arm can have difficulty opening bottles; a person with a stroke can have difficulty walking to get her medications; a person with impaired mobility may have problems getting a glass of water from the kitchen. Swallowing can also be functionally impaired and cause choking, aspiration, and the inability to swallow medications.

Impaired ability to perform **instrumental activities of daily living** can also affect medication regimens. For example, a person who does not drive a car may not be able to get medications from the pharmacy, or a person who cannot manage money may not be able to pay for the medications.

Hearing

The ability to hear instructions given by the health care provider or pharmacist is a very important part of the ability to take medications accurately and safely. The older adult may have a nonfunctioning hearing aid, not have their hearing aid in place, or be hard of hearing and have no hearing aid to use. Thus, it is conceivable that an older adult may not hear instructions given to

them by the health care provider to discard all old medications, to take three pills a day, or to call the doctor if they experience certain side effects.

Vision

Vision is another sense that is important to help ensure adherence to prescribed medication regimens. The ability to see to find the medication and read the label can be the difference between adherence and illness. Older adults need to be able to read the literature given to them about their medications, the times, dosages, and side effects.

Reading Ability

Closely associated with vision, the ability to read can affect the medication regimen. If the patient cannot read, can read only at a grade-school level, or cannot read the language in which the instructions are written, the "five rights" may be missed. Often, written instructions are given to the patient with the best of intentions, but the provider fails to ascertain that the patient can read, and understand, the written words. Also, medication instructions are often written at a high school level, whereas the patient may require instruction at a fifth grade level.

Memory/Cognition

Impaired memory can be a barrier to adherence with medication routines. Remembering which medications to take and at what times can be difficult if memory is impaired by dementia, delirium, or depression.

Motivation

Motivation is important in adherence to a medication routine. There must be motivation to obtain the medication, to learn about the medication, to take the medication on time, and to report inability to take medications to the physician. Motivation can be negatively affected by cognitive status, depression, and even societal or family pressures (see **Figure 8-1**).

Figure 8-1 Failure to take medications or attend to other health needs can be a sign that an older adult lacks motivation to adhere to the medication regimen.

Funding

Many older adults have difficulty purchasing medications due to costs. Medicare does not cover the cost of medications. Although Medicare has recently added a medication benefit, it will not fully cover the cost of all medications. Supplemental policies purchased by the older adult may help to cover the cost of some medications. Medicaid may supply funds for a limited number of medications, depending upon the state of residence. Persons without insurance, Medicare, or Medicaid may be unable to find the money to purchase needed medications or refills, and thus may go without.

Providers also share the responsibility for the cost of medications. The more medications prescribed, the higher the cost. Also, new, brand-name medications cost much more than those available in a generic form. Medicare D, which concerns prescription benefits, will be implemented in early 2006, and although it may make medications more affordable for some, it has been forecast to make day-to-day living more difficult for others, due to increased dollars taken from monthly Social Security checks to pay for membership in the program and high deductibles. With multiple providers of medications with differing formularies available for the beneficiaries of Medicare, it is yet to be seen if this will be an efficacious program.

One study found that as many as one third of the chronically ill elders who underuse prescription medications because of the cost never talk to the providers in advance. Many never raise the issue, due to embarrassment or misinterpretation of the provider's feelings. Of those who did not tell a clinician about their inability to pay for medications, 66% reported that no one even asked them about their ability to pay for the prescribed drugs, and 58% thought that the providers could not help them with funding issues. Of those who did talk to their provider about financial concerns, 31% reported that they were not offered less expensive alternatives, 30% were not given information about potential funding sources, and 28% were not given advice on pharmacies that could provide medications for less money (Piette, Heisler, & Wagner, 2004).

Nursing Interventions

Nurses in all settings have a responsibility to help ensure that the five rights are followed for each patient. Specific interventions should include:

- *Medication review:* This can take place in the outpatient or the inpatient setting. Ask the patient to bring in all of his or her medications, including over-the-counter (OTC) medications, for review. Compare patient medications to the medical records. Ensure that medications no longer prescribed are discarded. Discard any expired medications. Be alert for medications ordered by different providers. Inform the physician of any concerns. See **Table 8-6** for further information on medication review.
- *Education:* Ensure that the patient or the person who administers the medications to the patient thoroughly understands medication instructions. Provide them with a clearly written list that includes:
  - *Name of the medication:* Include both brand name and generic name.
  - *Schedule of administration:* Do not include medical terms such as qid, qd, or bid. Instead, write out "three times a day" or other instructions.

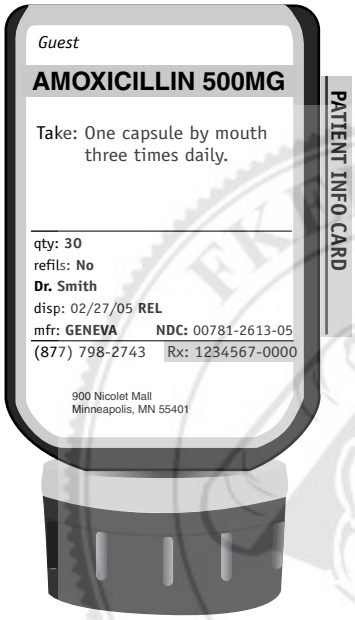
Table 8-6 TIPS FOR MEDICATION REVIEW

The following tips may serve as a format to use when doing a medication history:

- Current prescription medications
- Current over-the-counter and herbal medications, and frequencies
- Social drug use (e.g., alcohol, tobacco, caffeine)
- Home remedies
- Drug allergies
- Compliance assessment
- Medication administration (need for special devices, patient's mental status, caregiver administration)

  - *Dosage:* Clearly write out the dosage in full words, such as 10 milligrams or three pills. Instruct them in how to measure out the correct dose of the medication.
  - *Side effects to report:* Instruct the patient about adverse drug reactions and when to seek medical help. Be sure that the patient knows to whom to report adverse drug reactions.
  - *Evaluation of education:* Ask the patient or caregiver to repeat and/or read back instructions you have given them. Ask if they have any questions. Provide them the number of someone they can call if they have questions about their medications.
- *Accommodation:* Note sensory, motor, or cognitive limitations that the patient may have that would interfere with his or her understanding of medication instructions or ability to administer the medications. Ensure glasses and hearing aids are on and in place before educating about medications. Use large print written resources if necessary. Ask for specially adapted lids on pill bottles from the pharmacy to help facilitate opening lids. For example, Target corporation has redesigned the ordinary pill bottle, making it color coded for each family member, flattening the bottle so the label is easier to read, including a slot for patient instructions, and having a spot to hold oral syringes for liquid medications (see **Figure 8-2**). Obtain weekly pillboxes that can be filled by a health care provider every week. Help the patient investigate the high-tech options on the market to help improve adherence: prompting devices such as beeping pillboxes and talking watches, electronic medication vials, and hand-held electronic organizers (McGarry Logue, 2002). Obtain referrals for home health nurses for medication assistance and monitoring for persons with severe mobility or cognitive deficits. Ask the ordering provider to try to limit the number and frequency of medications. Occupational therapists and social workers can assist in addressing these types of accommodations.
- *Funding:* Assess the patient's ability to pay for medications—Medicare, Medicaid, supplemental plans, and out-of-pocket expenses. Consult a social worker to help with finding funding sources, if necessary. Ask the ordering provider to try to limit the number of

Figure 8-2 Newly designed medication bottle from Target corporation.



Source: The Institute for Safe Medicine Practices. Online at: http://www.ismp.org/CommunityArticles/Calendar/200505_1.htm

different medications, and to use cheaper, generic medications where possible.

A Brief Overview of Some Medications Used by the Older Adult Population

There is not enough space in this chapter to review all medications used by the elderly population, so just three of the more commonly used medication categories will be presented. The reader is referred to the resource list for information on other medications commonly prescribed for older adults.

Medications for Dementia

There are several new drugs on the market for dementia. Although there is as yet no cure, these medications help to slow the progress of the disease. Four medications are commonly used in patients with symptoms of mild to moderate Alzheimer's dementia. Tacrine (Cognex), donepezil (Aricept), rivastigmine tartrate (Exelon), and galantamine (Reminyl) are called cholinesterase inhibitors. They work to increase the brain's levels of acetylcholine, to restore communication between brain cells. Acetylcholine is thought to be important for memory and thinking. Benefits of these medications tend to occur at higher doses; unfortunately, higher doses have an increased likelihood of side effects (ElderCare Online, 2002; Health-cares.net, 2005).

Aricept is probably the most widely used drug. Although it does not cure Alzheimer's or keep it from getting worse, it does help relieve some of the memory loss. It is most effective in the early stages of the disease. The dosage is typically 5 mg per day to start, increasing to 10 mg, once a day. Side effects include diarrhea, vomiting, nausea, fatigue, insomnia, and weight loss (ElderCare Online, 2002; Health-cares.net, 2005).

Cognex is taken four times a day, has modest benefits, and does not work in patients with the ApoE4 gene. Cognex can potentially affect the liver, so liver enzymes must be closely monitored. Side effects of Cognex include nausea, vomiting, diarrhea, abdominal pain, rash, and indigestion. NSAIDs must be used with caution in combination with this drug (ElderCare Online, 2002; Health-cares.net, 2005).

Reminyl prevents the breakdown of acetylcholine and stimulates nicotinic receptors to

Box 8-2 Resource List

A listing of all indigent drug programs for over 900 medications: www.needymeds.com
AgeNet: http://www.agenet.com/
American Geriatric Society: http://www.americangeriatrics.org
American Geriatrics Society Immunization site: http://www.americangeriatrics.org/education/adultimmune.shtml
American Society of Consultant Pharmacists: http://www.ascp.com
Best Practices in Nursing Care to Older Adults from the Hartford Institute for Geriatric Nursing: http://www.hartfordign.org/publications/trythis/issue16.pdf
Geriatric Assessment: http://medinfo.ufl.edu/cme/geri/glossary.html#CGA
The Institute for Safe Medical Practices Medication Safety Alert: Nurse-Advise ERR: http://www.ismp.org/Nursing Articles/index.htm
Medline Plus (National Institutes of Health): http://www.medlineplus.gov
National Guidelines Clearinghouse: http://www.guidelines.gov
Rxassist, a program subsidized by the Robert Wood Johnson Foundation, serves as an intermediary between patients who need medications and the pharmaceutical industry's patient assistance programs: www.rxassist.org
RxList (The Internet Drug Index): http://www.rxlist.com

release more acetylcholine in the brain. It is taken twice a day. Side effects may include nausea, vomiting, diarrhea, and weight loss. Some antidepressants and other drugs with anticholinergic side effects may cause retention of Reminyl in the body. NSAIDs should be used with caution in combination with this drug (ElderCare Online, 2002).

Exelon is given twice a day. It works by preventing the breakdown of acetylcholine and butyrylcholine in the brain. Side effects may include nausea, vomiting, weight loss, upset stomach, and muscle weakness. NSAIDs should be used with caution in combination with this drug.

Because these four drugs work in a similar way, switching from one drug to another is not expected to improve the outcome. One medication or another may, however, be better tolerated with fewer side effects.

A fifth approved medication is an N-methyl D-aspartate (NMDA) agonist. Memantine (Namenda) is prescribed for the treatment of moderate Alzheimer's disease. It was approved for use in the United States in 2003. It reduces the abnormally high levels of glutamate associated with Alzheimer's-type dementia. The main effect is to slow progression from moderate to severe Alzheimer's disease. The prime advantage may be to maintain certain ADL functions a little longer, and thus maintain independence and decrease caregiver stress (Alzheimer's Disease Education and Referral [ADEAR], 2005).

NSAIDs are currently being studied for their usefulness in slowing the progression of Alzheimer's, as are vitamin E and gingko biloba.

Estrogen's effects on Alzheimer's are also of interest to researchers. Selegilene, an anti-Parkinson's drug, appears to slow the onset of Alzheimer's through an antioxidant effect (ADEAR, 2005; Health-cares.net, 2005).

Medications for Osteoporosis

Prevention of osteoporosis is vital in the older adult. Osteoporosis makes the older person more susceptible to fractures and changes posture, thus placing strain and stress on muscles and joints, and it can even affect height. There are two main types of drugs used for prevention and treatment of osteoporosis: antiresorptives and anabolic, or bone-forming, agents.

Antiresorptives slow the rate of bone remodeling, but cannot rebuild bone. Medications in this category include biphosphonates, hormone replacement therapy, and selective estrogen-receptor modulators (SERMs). Anabolic, or bone-forming, agents rebuild bone. Included in this category are parathyroid hormone and fluoride.

Biphosphonates inhibit osteoclast activity (bone resorption), increase bone mass, and are one of the front line classes of drugs for preventing osteoporosis in postmenopausal women and in persons taking corticosteroids or estrogen-suppressing medications. They reduce the risk of both hip and spine fractures. This class includes alendronate (Fosamax) and risedronate (Actonel). Both of these drugs are taken by mouth and should be taken in the morning with plain water, on an empty stomach. Once weekly dosing is possible with both. Studies have documented reduction of hip fracture with these two medications. In one study of 9,331 women, risedronate was found to reduce the 3-year risk of hip fracture by 40% in women with confirmed osteoporosis, and by 60% in a group of women with confirmed vertebral fractures at baseline. Another study showed that alendronate reduced the risk of hip fracture by 51% (ADAM, 2002; Kessel, 2004). Etidronate (Didronel) is an older biphosphonate that is sometimes prescribed and is also taken by mouth. Ibandronate (Boniva) was recently approved for use in the United States, but is not yet available for clinical use. Pamidronate (Aredia) is an injectable biphosphonate, as are zoledronic acid (Zometa) and ibandronate. These injectable forms do not cause GI distress as may the oral drugs. Investigative biphosphonates include clodronate and tiludronate (ADAM, 2002).

The National Osteoporosis Foundation's guidelines recommend that women with a below-normal bone density (of 2.5 SD or greater) and who have no history of fractures should take biphosphonates. They recommend consideration of biphosphonates for women with below-normal bone density (of 1 SD or more) with a history of fractures. Alendronate has been approved for use in men with osteoporosis; alendronate and risedronate are also approved for men and women taking corticosteroids. Side effects of this category of drugs include chest pain, heartburn, difficulty swallowing, and ulcers (ADAM, 2002).

Hormone replacement therapy (HRT) increases bone density. HRT consists of estrogen with or without progesterone. It also appears to improve balance and protect against falling. When women stop taking HRT, bone density decreases, and after 5 years off of HRT all protection is lost. Thus, to be of benefit, HRT needs to be taken for life, which is contraindicated due to increased risk for invasive breast cancer, ovarian cancer, heart attacks, strokes, and blood clots. A 2002 study of HRT (the Women's Health Initiative) was stopped before its

scheduled conclusion due to the emergence of these bad outcomes in some women on long-term HRT (ADAM, 2002; Kessel, 2004).

Some drugs have been specially designed to provide the same benefits on bone as HRT without increasing the risk of hormone-related cancers. These selective estrogen-receptor modulators (SERMs) include raloxifene (Evista), which has been approved for prevention of spinal fractures. Raloxifene is also indicated for the prevention and treatment of postmenopausal osteoporosis. Tamoxifen (Nolvadex) may reduce the risk for fractures, but has not been approved for this use. This medication causes increased risk for uterine cancer and blood clots, so its use for osteoporosis may be in question. Tibolone (Livial) is being used in Europe for improving bone density, especially in the lower spine, with minimal side effects. More study is required on SERMs before they may be deemed useful in the larger population (ADAM, 2002; Kessel, 2004).

Calcitonin also inhibits osteoclastic activity. It is available as a nasal spray (Miacalcin) or injectable (Calcimar). It is used to *treat* osteoporosis, unlike the above drugs. It may be a viable alternative for those unable to take biphosphonates or SERMs. It also appears to relieve bone pain associated with osteoporosis and fracture. Side effects include headache, dizziness, nausea, anorexia, rash, and edema. The nasal spray can cause nosebleed, sinusitis, and inflammation of the nasal membranes (ADAM, 2002; Kessel, 2004).

Parathyroid hormone in low, intermittent doses can stimulate bone production. It is indicated for use in postmenopausal women who are at high risk for fracture (history of fracture, multiple risk factors for fracture, or intolerant of other treatments). The benefits may persist after the injections have been stopped. Teriparatide (Forteo) has been approved for treatment of osteoporosis in postmenopausal women, but is not yet approved for men. Side effects include nausea, dizziness, and leg cramps (ADAM, 2002).

Calcium and vitamin D supplementation can reduce hip fracture risk. One study of 3,270 women found that 18 months of daily therapy with 1.2 g calcium and 800 IU of vitamin D produced a 43% reduction in hip fracture compared to placebo. Calcium and vitamin D also have been shown to improve femoral neck bone mineral density and reduce the incidence of nonvertebral fractures in both men and women. These two drugs are *not* considered to be adequate for prevention of fracture in high-risk women (ADAM, 2002; Kessel, 2004).

Several other medications are being studied for their usefulness in osteoporosis. These include osteoprotegerin, which prevents bone breakdown by regulating osteoclasts. Vitamin D derivatives are also being studied, as are statins, dehydroepiandrosterone (DHEA), testosterone, and strontium.

Medications for Anxiety

Several drugs are used to manage anxiety in the older adult. These drugs are appropriate when there is a clear diagnosis of anxiety disorder and a poor response to alternative therapies. As with any medication for the aged, it is recommended that the practitioner start low (dosage) and go slow (make changes slowly).

Benzodiazepines have a long history of use in this age group. Many elders have long-term prescriptions for benzodiazepines such as Valium. In 2003, 18.7% of Texas nursing facility residents age 65 or older were taking benzodiazepines, one fifth of which were long-acting benzodiazepines (Quality Matters, 2004). Long-acting benzodiazepines, however, should be used with great caution in the older adult, due to the

long half-life and changes in the metabolism and excretion of drugs. Short-acting benzodiazepines can be substituted and should be limited to less than 4 months' use. Short-acting benzodiazepines include lorazepam and oxazepam. Paradoxical reactions to benzodiazepines have been reported in the elderly. Symptoms include irritability, anger, and loss of control (Lantz, 2003). Benzodiazepine tapering and withdrawal can be a difficult process and is usually done over 6–12 weeks. Withdrawal symptoms are common and often difficult to differentiate from anxiety symptoms (Gliatto, 2000). As mentioned earlier in this chapter, benzodiazepines are on the Beers list of inappropriate drugs in the elderly. Although short-acting benzodiazepines may be used short term for immediate relief of symptoms, they are typically used until the slower-onset medications have begun to show an effect.

Buspirone can help manage anxiety, does not lead to cognitve impairment, and has no addictive potential or sedative effect. It can cause paradoxical agitation in persons with dementia, and it may actually worsen symptoms of cognitve impairment. Persons who have used benzodiazepines extensively in the past are unlikely to benefit from buspirone. Buspirone can take 3–5 weeks before maximal effect is seen (Aparasu, Mort, & Aparasu, 2001; Quality Matters, 2004).

Antidepressants may be used as a first line treatment of anxiety disorders in older adults, particularly the selective serotonin reuptake inhibitors (SSRIs). Long-term use of SSRIs for anxiety has not been well evaluated. SSRIs commonly used include fluvoxamine, fluoxetine, sertraline, and paroxetine. SSRIs used for anxiety are prescribed at a lower dose than when used for depression. One drawback to use of SSRIs for anxiety is the length of time to onset of relief—it may take weeks for the effects to begin. Paroxetine, which has anticholinergic effects, should be used with caution in the elderly (Quality Matters, 2004).

Anxiety medications must be used with caution in the older adult. Any medication that affects cognition (thinking), memory, or balance and gait is a safety concern in this population.

Conclusion

Nurses have a unique opportunity to partner with older adults and to contribute to the success of prescribed medication regimens. The biopsychosocial effects of aging can negatively affect the success of a medication routine; nurses have the knowledge and ability to counteract many of these effects in conjunction with the health care team. **Table 8-7** provides a summary of the key concepts related to medications and the older adult.

Don't be afraid to take the lead in reviewing a patient's medications, screening for inappropriate prescriptions, recommending alternatives, and educating the older adult on medications. You may be the only barrier between an older adult and an adverse drug reaction.

Table 8–7 Key Concepts in Geriatric Pharmacology

- Older adults make up about 13% of the population, but consume 33% of all prescription medications.
- Older adults have significant physiological changes related to aging that may interfere with medications.
- The elderly are more sensitive to the effects of drug therapy.
- Adverse drug reactions are any noxious, unintended, or undesired effect of a drug that occurs at doses in humans for prophylaxis, diagnosis, or therapy.
- Certain disease states may interfere with optimal drug therapy.
- Polypharmacy is defined as the prescription, administration, or use of more medications than are clinically indicated for a patient.
- Inappropriate prescribing may be very harmful to elderly persons.
- Compliance to drug regimens is essential to improving medical diagnosis and outcomes.

Critical Thinking Exercises

1. Mr. Lockwood, a 102-year-old man, is admitted to the hospital from home with a diagnosis of hypotension and dizziness. He lives at home with his grandson, who, Mr. Lockwood says, is gone most of the time. You notice that Mr. Lockwood takes at least 10 different medications. What are your concerns for medication compliance with this patient?
2. Ms. Adams is a geriatric patient who you see in your rounds for a home health agency. You are suspicious that something is wrong, because she continues to complain of back pain, although pain medications have been prescribed. When you check her pill bottle, it is empty. You call the pharmacy, who says that that prescription for 60 pills was filled last week. How might you respond to this situation? Which health care professionals might be of assistance in clarifying the issue?
3. Mrs. Young lives alone in her house. She is 87 years old, and you suspect that she has dementia. Mrs. Young refuses to allow health care workers into her home. When you assist with discharge planning from the acute care hospital for Mrs. Young, you become worried because you doubt that she will take her medications properly. What resources are available to help Mrs. Young have a safe discharge?

Personal Reflections

1. Think about the medications that you have administered to older adults during your time as a nursing student or nurse. How often have you considered drug interactions and the importance of therapeutic levels in the elderly? How important is it to draw peak and trough levels at the correct time?
2. Which team members play a vital role in assisting you as a nurse to help the patients or residents gain the best therapeutic effect from their medication regimens?
3. Which of the topics in this chapter were least familiar to you? Which topics will you pay more attention to in the future?
4. Do you always think about the five rights when you administer medications? Why or why not?
5. What are some solutions for the problem of identifying residents prior to giving medications in long-term care facilities where name bands are not worn?

Glossary

Absorption: Movement of drugs from the point of entry into the body into the bloodstream.

Activities of daily living (ADL): Self-care activities, including washing, bathing, grooming, dressing, toileting, eating, and mobility.

Adherence: Compliance with prescribed medication regimen.

Adverse drug reaction (ADR): Any noxious or unintended reaction to a drug that is administered in standard doses by the proper route for the purpose of prophylaxis, diagnosis, or treatment.

Compliance: Taking the prescribed medication at the right time, in the right dose, by the right route, by the right person.

Distribution: Movement of a drug from plasma into the cells.

Drug–disease interaction: The worsening of a disease by a medication.

Drug–drug interaction: Alteration of the pharmacodynamics of Drug A when taken at the same time as Drug B.

Excretion: Elimination of a drug from the body after metabolism.

Food–drug interations: Alteration in pharmacodynamics of a drug when taken with food or certain foods.

Function: The physiological activity of a body part.

Instrumental activities of daily living: Higher level ADLs—preparing meals, shopping, managing money, using the telephone, and performing housework.

Metabolism: The process by which the body breaks down and converts medication into active chemical substances.

Peak blood level: Blood test done to measure the level of medication in the blood; drawn when the highest amount of medication in the bloodstream is expected to be present.

Pharmacodynamics: The time course and effect of drugs on cellular and organ function.

Pharmacokinetics: The time course by which the body absorbs, distributes, metabolizes, and excretes drugs.

Polypharmacy: The prescription, administration, or use of more medications than are clinically indicated in a given patient.

Random blood level: Blood test done to measure the level of medication in the blood; drawn without regard to the time of administration of the drug.

Trough blood level: Blood test done to measure the level of medication in the blood; drawn immediately before the next scheduled dose of medication.

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Chapter 9

Changes That Affect Independence in Later Life

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LEARNING OBJECTIVES

At the end of this chapter, the reader will be able to:

1. Recognize the importance of self-care in maintaining independence in later life.
2. Acknowledge influences of the environment and living situation on the ability to maintain independence.
3. Identify strategies to maximize physical and mental function.
4. Acknowledge multiple role changes and transitions that are common to the elderly.
5. Develop awareness of preventing complications of existing illness or disease.
6. Appreciate the value of rehabilitation.
7. Identify the appropriateness of physical and chemical restraints, as well as suitable alternatives when available.
8. Describe caregiving options for the elderly and community resources especially suitable to meet their needs.

KEY TERMS

- Basic activities of daily living (BADLs)
- Frailty
- Functional ability
- Independence
- Instrumental activities of daily living (IADLs)
- Living skills
- Quality of life
- Restraints
- Self-care

> "An ounce of prevention is worth a pound of cure."
>
> —Henry deBracton

This adage, commonly heard, rings true when considering the factors that influence independence in later life. Health, personality, state of mind, and emotional, physical, and spiritual support all have a place in the adjustments one makes to the aging process. Although **self-care** and health promotion are indeed important in maintaining **independence**, aging and accompanying health factors often make this a very difficult period of life. As a person moves from the earlier adjustments of aging (65–75 years) to the later ones (75–85+ years), circumstances may become even more complex. Although level of physical activity tends to decrease with aging, "many older people can maintain health through social, intellectual, and cultural activities" (Fone & Lundgren-Lundquist, 2003, p. 1051).

Although it is important, **high functional ability** is not absolutely necessary for high **quality of life**. Because many elderly have chronic disabilities, it is important to recognize this distinction and find ways to maximize quality of life through other means—including spirituality, social engagement, environment, and connection—in addition to physical activity programs (Johansson, 2003).

Successful aging has been defined as "the ability to maintain three key behaviors: low risk of disease and disease-related disability, high mental and physical function, and active engagement of life" (Rowe & Kahn, 1998, p. 3). This chapter will discuss the factors that influence these behaviors. The case study interspersed throughout this chapter follows the story of one couple in transition.

Bessie and Sadie, the "Delany Sisters," are famous for remaining physically and mentally active into their second century. They experienced being on the best-seller book list, television talk shows, and national notoriety—all after they became 101 and 103 years of age, respectively! Their comments, advice, and wisdom are quoted periodically throughout this chapter to illustrate their attitudes about living fully.

> "No matter how old you get, you think of yourself as young. In our dreams, we are always young."
>
> —Sadie Delany (1994, p. 40)

> "Most folks think getting older means giving up, not trying anything new. Well, we don't agree with that. As long as you can see each day as a chance for something new to happen, something you never experienced before, you will stay young . . . even after a century of living, we haven't tried everything. We've only just started."
>
> —Sadie Delany (1994, p. 11)

Maintaining Independence

Influences of Environment and Living Situation

> "So we do our little bit. Getting involved is satisfying. It keeps us busy and makes us useful. Everyone has something to contribute!"
>
> —Bessie Delany (1994, p. 90)

Maintaining maximum independence while maintaining maximum quality of life is a balance sought by the elderly, their caregivers, and society in general. Aspects of achieving this balance are often in conflict with each other, and

are certainly affected by many factors involved in the aging process.

Any evaluation of quality of life should include the perceptions of the person being evaluated. Even those with dementia are able to identify mood state, at times with more accuracy than their caregivers. Consideration of the whole person is important, and in so doing, the interdisciplinary team gains importance in developing evaluations, methods, and interventions (Johansson, 2003).

Living Skills

Remaining in the community for as long as possible is the goal for most Americans, so it is important to be able to evaluate the ability of the person to remain safely in the community while having his or her needs met in an appropriate manner. Such an evaluation might utilize the Kohlman Evaluation of Living Skills (KELS), which has been adapted for the geriatric population and is commonly administered by occupational therapists. It assesses 17 daily **living skills** under five categories—self-care, safety and health, money management, transportation and telephone use, and work and leisure (Zimnavoda, Weinblatt, & Katz, 2002). Other evaluations that can help determine aspects of appropriateness for independent/community living include the Routine Task Inventory (RTI), the Functional Independence Measure (FIM), and the Mini Mental State Examination (MMSE), which screens for dementia—and against which the KELS was tested and compared.

Having practical, realistic, and nonsubjective evaluation tools would likely improve the elderly person's ability to identify and reconcile the need for more care, and would certainly help families who are struggling to identify the level of assistance required by their elderly relatives. For example, a simple evaluation of the ability to use the telephone may help determine the appropriateness of a person to remain in the community. Tested on persons living alone with a dementia diagnosis, a study found that if a person is unable to reply to a letter requesting a call and if they are unable to use the telephone book, home-alone safety must be questioned. Continuous "practice" in calling frequently used numbers (of family or caregivers) may help for a while, but when a person who lives alone cannot call for assistance or health care, and when even social communication by telephone has become too demanding to cope with, the safety risks of living alone must be considered (Nygard & Starkhammar, 2003).

Housing Influences

The word *home* holds special meanings, usually associated with familiarity as well as security, stability, feelings and memories, a sense of personal identity, and a place where we are in control and have choices. Moving from home to another setting may precipitate a loss of these special meanings and may be a very difficult adjustment—especially if the person is not a part of the planning, decision making, and distribution of belongings. When a move is seen as "something better," adjustment is easier. When it is due to disability and/or the need for additional care, the multiple losses of friends, independence, and control must be acknowledged and grieved. Health care workers and family members need to understand and acknowledge the person's feelings about all these issues and provide assistance and support throughout the adjustment (White, 2003).

Housing choices are greatly influenced by the socioeconomic status and resources of the elderly person. Individuals with more access to quality health care often have better functional abilities and longer life expectancies (Stupp, 2000).

Better functional ability and income then affect the number of options and types of living choices available to meet the needs of the elderly, which may, in turn, impact their health. Those with limited incomes may not be able to afford some of the choices that might lead to a healthier living environment.

Housing options include:

- One's own home
- Family/relative's home
- Senior living complexes/continuing care retirement communities
- Assisted living
- Paid caregiver homes—licensed or unlicensed
- Extended care facilities

Carefully designed and implemented retirement communities address the concerns and feelings of displacement that moving from one's home to the unfamiliarity of new surroundings engenders. Some communities provide housing, community life, socialization, transportation, and health care for the elderly. Easily accessible on-site services—which might include recreational activities, social services, spiritual support, banking, and health care—provide a continuum of care that offers an opportunity to "age in place." Other care needs are met with additional services as the needs manifest themselves. Some communities include assisted living and extended care facilities within the community itself. These communities usually require payment of fees and monthly service charges (Reicherter & Billek-Sawhney, 2003).

For those who can afford them, retirement communities offer a certain freedom from the stresses of family care, while offering additional security from the risks of neighborhood living. Compared to older people living in the local neighborhood, the retirement community population in one study better maintained their physical and mental health. Peer support, safety and security, and autonomy with inclusion were important factors in maintaining health status. Age-specific shared living can also contribute to enhanced morale while serving as an antidote to age-related prejudice (Kingston, Bernard, Biggs, & Nettleton, 2001).

Self-Care

> "I'd say one of the most important qualities to have is the ability to create joy in your life. . . . I love my garden so much that I would stay out there all day long if Sadie let me. That's what I mean about creating joy in your life. We all have to do it for ourselves."
>
> —Bessie Delany (1994, pp. 32–33).

Maintaining interests or developing new ones is a measure of satisfactory aging. Learning, growing, creating, and enjoying are some of the essential outcomes for measurement of successful aging. Satisfaction and personal growth transcend developmental stages, and are dependent on the individual's prior interests, ability to focus on new interests, and availability of and access to additional resources.

For the elderly person with the capacity for activities of some kind, doing for others is another way to measure satisfactory aging. Altruism is high in the elderly; charity giving is proportionately higher for older than for younger age groups (Ebersole & Hess, 1998). Volunteering in various capacities is another way the older person can contribute to his or her community—through peer support, church activities, even maintenance of a small area of an extended care facility. One lady ran a small gift shop of donated items for an hour or two per day in her facility. Another brought her pet bird to

visit the residents. These small gestures were activities well within the capabilities of mobility-limited women, but brought them pleasure and contributed to the morale of others as well.

A Canadian study suggests that a uniform concept of frailty, relevant to older adults, would have important policy implications, and could improve the planning and distribution of services to those who would benefit. The study recommends a uniform theoretical approach that is multidimensional (not age-related), subjectively defined, and includes both individual and environmental factors (Fried et al., 2001).

Frailty is perceived as a general decline in the physical function of older adults that can increase vulnerability to illness and decline. Defining characteristics include unintentional weight loss of more than 10% in the prior year, feelings of exhaustion, grip strength in the weakest 20% for age, walking speed in the lowest 20% for age, and low caloric expenditure (<270 kcal) per week on physical activity. Neither age nor disability alone makes a person frail, but changes that often occur with age may contribute significantly to its presence. At nearly every age past 65, women commonly experience frailty at a greater percentage than men (Fried et al., 2001).

Harvard Women's Health Watch (Forestalling Frailty, 2003) suggests several steps that can be taken to prevent or interrupt the course of frailty:

- Maintain a healthy weight and diet
- Stay active
- Practice fall prevention
- Make connections—maintain relationships with others
- See medical personnel regularly—physician, eye doctor, dentist

> "Some people, older people especially, tend to draw into themselves . . . they grow isolated. That's a big mistake! You never know when you might need other people, but you need to earn their help. You have to contribute to your community."
>
> —Bessie Delany (1994, p. 89)

Role Changes/Transitions

Multiple role changes occur over the course of one's life, and that is no different for the elderly. Changes are sometimes affected by choice, but as one ages, the role changes and transitions may increasingly occur outside the control of the individual. They may be abrupt, crisis-oriented, and undesired, or there may be some time and opportunity for adjustment to the change. Some changes may be very subtle, with a slow shift from one self-concept to another—mostly recognized after the fact. Past skills and a series of adaptations may prepare for some transitions—like the primary shift from parenting to grandparenting—making them smoother and less stressful. But the shift from functional independence to functional dependence and from health to illness crosses many aspects of life, and likely requires a series of transitional adjustments. These transitions require the freedom of the individual to try various possibilities, as within any other stage of life. Exploration and independence in making adjustments should be encouraged (Ebersole & Hess, 1998).

Retirement

Retirement is perhaps one of the most common role changes faced by the aging. This is an occurrence that either can be planned for and anticipated, may be sudden and unexpected related to illness or injury, or may present along some continuum between the two. Some people find a lack of purpose and fulfillment with this transition, whereas others feel a new sense of personal freedom and time for activities

postponed during busier years. Some additionally find their availability tempered with the need to provide care to those around them, whether older or younger.

Some make the choice to continue to work past "retirement age" because of financial necessity, enjoyment of the challenge, socialization, a need for structure, or for the status inherent in the work role. Others, who retire unwillingly, may be at greater risk for unsuccessful adjustments—including alcoholism, depression, and suicide. These people are perhaps likely to seek medical

Case Study 9-1

Bill retired at age 65 from a major corporation, where he had been an engineer specializing in materials testing and acquisition for the company's product. Marge was a homemaker, who worked part time in her church office and a gift shop after their four children were grown and left the house. Bill and Marge were raised during the Depression years, and had developed frugal living and financial habits, which enabled them to acquire a sufficient nest egg for their retirement and later years.

They physically worked hard together over the years in building their dream home on a small lake, valuing independence and self-sufficiency as very important quality-of-life indicators. Their relationship of 50 years was frequently contentious, and they often quarreled or verbally sparred as a mode of communication. They were, however, quite committed to each other and Marge did not consider a life without Bill. Marge had been medicated for years for treatment of depression, but had not taken advantage of the recommended counseling support to increase the efficacy of her medication because of Bill's lack of faith in the counseling process and his active ridicule when she attempted it.

At the age of 68, Marge was diagnosed with breast cancer. When their long-time family physician retired the day after her diagnosis, she decided to seek active treatment with an oncologist friend of her daughter who lived in Apex, 3 hours away in the next state. Considerable trust in the physician and ability to maintain some independence in the familiarity of their travel trailer parked in a daughter's driveway made this decision possible. She underwent a left mastectomy at the hospital in Apex.

Critical Thinking: As the discharge nurse at the hospital, what factors influence your suggestions for follow-up protocols/procedures? Consider the traditional release instructions; patient to be 150 miles from the physician with physical assistance from her husband; and the family being less accessible due to distance.

intervention, but may not recognize the underlying depression.

Health Transition

The transition from health to illness involves changes in lifestyle, self-concept, and perhaps a lost sense of value and relationships. It is also a change that may occur very subtly, over time, with the development of chronic conditions of increasing disability. Or it may have a sudden onset with a precipitating medical event.

Loss of Spouse

Loss of a spouse provides a profound role change, with numerous transitions. Women who are widowed commonly experience anxiety and fear in the first few years after their loss. Losing the partner of a long, close, and satisfying relationship may feel like the loss of self and one's "core." Even those widows who successfully reorganize their lives and invest in family, friends, and activities find they still profoundly miss their "other half." A new identity, with autonomy and individuation, are often products of a successful adaptation to widowhood. This adaptation may or may not include remarriage.

Long-term relationships that were markedly unsatisfying may result in a degree of complicated mourning for the widow or widower, accompanied by guilt, anger, or perhaps relief that the relationship has ended. The potential exists that the remaining partner may find other outlets for the negativity he or she expressed in the relationship, or that he or she may not have the self-confidence or ability for independent decision making because of a long history of domination by the other. This will likely affect their roles with their families or other support systems.

Generally speaking, men who are widowed often hide their grief in a distorted concept of "manliness," in which they carry their pain alone. Until recent years, society has not given men the same explicit permission to grieve as it had afforded to women. Widowers seem to

Case Study 9-2

Marge's treatment over the next year consisted of 6 months of chemotherapy, CT scans, oncology appointments. Soon Marge and Bill would travel with their trailer to Apex for each course of treatment as it was scheduled, stay a few days in their daughter's driveway after treatment, and then return to their own home, where Bill cared for her until her treatment reactions subsided. Marge was devastated by her hair loss, and especially by the nausea and vomiting episodes that cumulatively increased with each treatment. Nearing the end of the scheduled treatments, she was begging to forego the last one.

Critical Thinking: As the oncologist's office nurse, how would you respond to Marge's family who called, relating her tearful refusal to submit to the last chemo treatment, and requesting your advice?

pay less attention to themselves, lose social contacts, and can experience an erosion of self-confidence and sexuality. Widower status in elderly men has been found to be a risk factor for increased dependency in activities of daily living (ADLs) and mobility (van den Brink, 2004). Some men tend to reinvest in new relationships in search of the lost mate, before reconciling to the death of their spouse.

Becoming more common for the elderly, divorce can force a change in roles. The necessity to grieve is similar for this change in role, and may be more devastating if it is unanticipated. There are major individual and generational differences in the expectations for marriage, but even older couples are becoming less likely to remain in unsatisfactory relationships (Ebersole & Hess, 1998).

Individuals with few family or social supports have a more difficult time adjusting to the loss of a spouse than do those with information about the grief process, sufficient support, and permission and time to experience fully their grief.

Role Reversal

Role reversal with a spouse or adult children often occurs for the aging person, as the elder moves from care provider to care recipient through the course of aging. When a very strong and independent elder experiences failing health, the transition to dependency may drain the energies of both the provider and the recipient who are part of the role reversal. If a spouse or adult child is a rather passive or dependent person, they may need considerable help in adjusting to the transitions (Ebersole & Hess, 1998).

Case Study 9-3

Bill and Marge celebrated their 50th wedding anniversary with a wig and a large party of family, extended family, and friends on the lawn of their beloved lake house. They were able to travel in their trailer for a number of years, even renting their house out for a few years. They spent their time wintering in the south, visiting various family members during the summers, and taking extended travel trips with their travel association. They carried their medical records with them and were treated as needed in the locations where they spent the most time.

Marge had large toe joint replacement while they wintered in Florida, and was able to rehab and resume her routine of walking several miles per day. This exercise not only allowed her to be out in the natural beauty of the location, which she cherished, but also kept her in shape and stimulated her ability to sleep better at night, as well as providing some separation from Bill for several hours each day.

During one winter away, Bill was examined for cardiac dysrythmia and palpitations, was diagnosed with tachycardia, and was given medications to control the symptoms he experienced. They returned to life at their home by the lake

when Marge began reporting increased confusion in Bill, as well as expressing some fears about his driving, also witnessed by one of the adult children visiting them for a spring break vacation. A daughter traveled to Florida to drive them and their travel trailer home. Bill voiced much displeasure at the daughter's insistence on driving—insisting he was a far better driver—even though his family had observed confusion in a major intersection, driving the wrong way on a marked street, and other incidents.

After significant family intervention, including individual conversations and a family meeting to discuss the driving concerns, Bill was evaluated by a physician and agreed to psychological testing to determine his ability to continue driving. Probably because of his propensity for mechanics and IQ, Bill placed in the low acceptable percentiles of the test results for his age group and gender. However, the family questioned the test validity because the administrator didn't account for Bill's history as an engineer and did not take into account the many reports of the decline in Bill's own function vs. the standardized test results. As a result, Bill drove awhile longer, until the physician prohibited his driving some months later after more family reports of increasing safety issues.

With this forced curtailment of driving, Bill became very angry, demonstrating much difficulty in coping and definite grieving. His negativity and demanding behavior placed increased stress on Marge. He often refused to allow her to drive, making demeaning comments when she did. He further blamed family conspiracy and the physician, challenging suggested medical interventions and her professional judgment.

Personal Reflection: As a student nurse and a college student now embarking on your own quest for independence, can you relate to losing a major independent activity such as driving? Has anyone in your family faced such a situation? How might you help your parents or your grandparents with the adjustment to giving up driving, a major factor in a person's perception of independence?

Some older persons may enjoy the dependency of their failing health and can create burdens for their families and caregivers. Their demanding personalities and failure to maximize their remaining independence can tax the strength, resources, and patience of their caregivers.

Driving

Driving a car is an area of independence with strong emotional and psychological implications, in addition to those of physical capacity. It represents the ability to maintain connections and contribute to the community (Silverstein et al., 2004). Dementia, use of some medications, fractures, cardiac conditions, and poor vision may limit a person's ability to drive, and cessation of driving has been shown to increase symptoms of depression for up to 6 years (Kakaiya, Tisovec, & Fulkerson, 2000).

Safe driving requires not only sound physical and mental capacity, but also alertness, the ability to interpret and judge surroundings, and

appropriate reflexes and strength for reaction. The elderly person may be experiencing decline in some of these abilities. The ultimate decision as to whether a person should continue to drive is made by the local licensing authority, but families and patients often look to their doctor for help in determining the person's continuing fitness to drive. A number of factors influence the evaluation of fitness to drive, as outlined in **Box 9-1**.

Box 9-1 Evaluation Factors of Fitness to Drive

- Crash rates per mile driven
- Modification of driving (e.g., fewer miles driven per month; limiting driving to familiar roads, daytime hours, or good weather conditions)
- Driving history (e.g., getting lost in familiar surroundings, near misses, near crashes, traffic violation tickets)
- Medication use
- Visual faculties needed for safe driving (e.g., contraction of visual fields, decline in resistance to glare)
- Cognition assessment instruments (e.g., Mini Mental State Examination, Washington Clinical Rating Scale)
- On-road test by driver's licensing authority
- Effect of terminating patient's right to drive

Source: Kakaiya, R., et al. Evaluation of fitness to drive: The physician's role in assessing elderly or demented patients. *Postgrad Med 2000, 107*(3), 229–236.

Instrumental Activities of Daily Living

Instrumental activities of daily living (IADLs), such as cleaning and cooking, shopping, running errands, keeping appointments, maintaining the checkbook, and paying bills, may require the assistance of others. Access to these opportunities is often limited by functional limitations—sometimes briefly, as during convalescence from a surgery or temporary disability. Sometimes a precipitating event or advancing illness makes these role changes more permanent.

Basic Activities of Daily Living

Basic activities of daily living (BADLs) involve personal care, such as bathing, dressing, and feeding. The need for assistance in these activities usually comes subsequent to the need for help with IADLs, unless there is a precipitating factor that causes the need. As physical abilities decrease, need for assistance increases.

Caregiving

As a person requires more and more assistance with IADLs and BADLs, issues of caregiving escalate. At times, the need for caregiver assistance arises long before acceptance of that care. Some elderly may resist recognition of the need for help because that very need exemplifies their increasing limitations and the inability to maintain their independence. Family members may also resist recognizing the need, not wanting to diminish the dignity and freedom of choice for their loved one.

Case Study 9-4

Within several years, Marge was diagnosed with Parkinson's disease in its early stages and experienced an increase in her depression, anticipating the expected progressive nature of the disease and demonstrating her fear of a much reduced quality of life. She was embarrassed by the shaking symptoms, and tended to isolate herself—declining some dinner and other outing invitations she had previously enjoyed. This tended to separate her from some of her long-standing friends, acquaintances, and church activities. It also kept her at home more in Bill's ongoing negative presence.

Bill's new physician sent him for a cardiac oblation procedure that effectively took care of his symptoms. He was able to discontinue his medications for that problem, and he and his family began seeing a measure of improvement in his confusion and ability to concentrate. To Bill this, of course, meant he was able to drive again, which he did—to the trepidation of his family. In Florida for the winter once again, he reobtained permission to drive from a doctor-friend from church, who neither invited nor considered any family input. It also cemented in his mind his perception that the doctors had erred in giving him the cardiac medication in the first place. He did not acknowledge that the medicine had managed his symptoms for several years. It further bolstered his resistance to obtaining medical care for himself while at the same time negating the care Marge was seeking and receiving for her Parkinson's diagnosis and increasing depression.

Living in their hometown placed Bill and Marge 150–250 miles from any of their four adult children. At the ages of 78 and 73, they reluctantly made the decision to give up their dream home of 40 years. Their long-time circle of friends was gradually shrinking. They were no longer able to maintain the rigorous maintenance schedule for their too-large house, and they were experiencing increased physical problems. Although Bill did not perceive the need for himself, he was able to accommodate the decision "for Marge's sake," recognizing she would need increasing help as time passed and her Parkinson's progressed. Marge looked forward to being nearer three of her four children, and in actual proximity to two of them. Bill and Marge sold their home and invested in a condominium near Apex, between two of their daughters.

They also developed their estate plan, completed advance directives, and

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discussed with their children their desire to remain in their own home throughout their lifetimes. They planned to bring in assistance as needed for meeting their care needs, which they readily verbalized would only increase over time. In fact, their condo could accommodate a live-in caregiver with a separate bedroom, sitting area, and private bathroom.

Bill was diagnosed with benign prostate enlargement, and tested several times for cancer because of his high PSA test results and frequent leaks from his bladder. Over a period of months he had a TURP procedure but experienced ongoing difficulty urinating and with urinary retention, necessitating Foley catheter placement. His urologist ordered home nursing for catheter care and teaching related to its use. While insisting on being largely independent with day-to-day ADLs, Bill mostly ignored his need for bathing and grooming—satisfied to wear the same clothes until Marge captured them for the laundry. He could empty his catheter bag by himself, but he apparently did not comprehend the need for clean technique when handling the catheter. When the home care nurse visited, Marge reported to her that he often let the bag drag by the catheter tubing behind him on the floor when he walked through the house, while he sat at the kitchen table, or went to bed. This did not appear to be painful to him, and he disregarded any family discussion about tight connections, sterile atmosphere, and the social impact of his habit.

Bill was resistant to bathing and shaving—sometimes going for more than a week or two. He would resent and decline Marge's encouragement and offer of help to do his personal care; he especially resented his family's request for a home health aide to encourage and assist him in bathing.

During this time frame, Bill and Marge's family tried a variety of arrangements to meet their increasing needs, including a housekeeper every week, a cook three times a week to prepare Marge's diabetic meals, prepared meal delivery, and aide assistance for bathing and personal care.

Critical Thinking: As the visiting home care nurse, how would you approach Bill regarding catheter care, personal care, motivation for self-care, Marge's reports of frequent dozing wherever he was, and refusal to eat the meals arranged for by his family?

Are there other possible diagnoses Bill's family should be aware of, alerted to, or educated about?

What other resources may assist them in maintaining some level of independence at home, at this stage of their aging and increasing needs?

Personal Reflection: Imagine that you are 70–80 years old and must decide what to do with your lifetime of belongings, because your new location will accommodate less than half of them. What do you take? What do you do with the rest?

Caregiving Options

> "Don't depend too much on any one person. If you have a lot of helpers, you can be sure that someone will always be available when you need it. You'll feel a lot more independent. We have different folks who do different things for us—like give us a ride, go to the post office, or buy our vitamins. By spreading out these little favors, we're not a big burden on anyone."
> —Sadie and Bessie Delany (1994, p. 126)

A broad spectrum of caregiving options is available when unassisted independent living is no longer possible or appropriate:

- *Independent living with help:* Cooks, companions, cleaning service—informal or formal.
- *Family:* Usually informal; may live in patient's or family member's home.
- *Adult daycare at a facility:* Part-time temporary assistance, frequently for respite or while a family caregiver works; often used for persons with dementia or for the frail elderly needing assistance or at risk for social isolation. Usual discharge is to assisted living or death.
- *Adult daycare at home:* Part-time respite, as above.
- *Senior living complexes/continuing care retirement communities:* Full range or limited services, depending on the community and level of assistance needed; can be progressive as needs increase.
- *Assisted living:* Homelike setting with more physical and medical care available than in senior complexes.
- *Paid caregiver homes (licensed or unlicensed):* Caregivers accept one or several nonrelatives into their home to receive 24-hour assistance, especially with BADLs, on a private-pay basis.
- *Extended care facilities:* Skilled or intermediate care nursing home facilities for rehabilitation on ongoing care. Can be paid by Medicare, Medicaid, or private pay, depending on financial resources. Preadmission screening is usually required by the state regulatory agency.

In planning and making placement for care, it is advisable to request and check references. Further discussion of these settings in relationship to nursing care is provided in Chapter 1.

Family caregivers provide the major percentage of informal, in-home caregiving—sometimes at the cost of career advancement, and even the ability to retain employment if the care needs become too great. Family caregivers are challenged by lack of information, lack of practical skills training, and physical and emotional strain. Nurses have the opportunity to impact the care of their patient by giving attention to the family caregivers, remembering that care of the person also means care of the caregiver. In doing this, nurses need to think of the family as the extension of the patient. Several principles apply:

- Provide community resource information for ongoing help to the patient/family.
- Offer anticipatory guidance toward practical and emotional support resources.
- Respect all family caregivers. Assume they are doing the best they can under difficult circumstances.

- Help identify the strengths of the family caregivers, and point them out concretely; give positive reinforcement in all care settings.
- Help family caregivers recognize their own needs and limitations, because they may be at risk for their own health problems (Reinhard, 2001).

In interviews with caregivers, the nurse or interdisciplinary team member may gain additional insight into the patient/caregiver situation from the use of humor by caregivers. Often when relating anecdotes about various aspects of care, the caregiver might use humor to mask discomfort in talking about the issue. Use of humor may also provide caregivers with a face-saving way to explain thoughts and actions in their care provider role. Humor may also provide a clue that the area being discussed may be an area of unresolved conflict or concern, without the caregiver having to say that he or she is having difficulty. Sensitive probing questions may help identify the need for additional education, revision of treatment plan, or more practical assistance for the patient and caregiver (Sparks, Travis, & Pecchioni, 2000).

Patients, family members, and caregivers may also use humor as stress relief, and to lighten the load of providing care. Humor can provide a welcome relief to the often serious aspects of caretaking.

> "Never lose your sense of humor. The happiest people are the ones who are able to laugh at themselves."
>
> —Sadie and Bessie Delany (1994, p. 34)

Caregiver stress may be a factor in whether a person can remain in the home setting. Caregivers who live with their care recipient have a higher level of strain than those who live separately. Financial resources and/or higher education levels do not necessarily mean that the role strain is lessened. The health of the caregiver is important in determining stress levels; when the caregiver's health is poor in addition to that of the care recipient, caregiver stress is likely to be higher (Williams, Dilworth-Anderson, & Goodwin, 2003). Follow-up contacts initiated by agencies receiving a referral for families who need assistance and support enhance the use of those services by the families/caregivers (McCallion, Toseland, Gerber, & Banks, 2004).

Sometimes the elderly feel they have outlived their meaning, purpose, and usefulness—especially if they are debilitated and must depend on others for care. Ira Byock, in his book, *The Four Things That Matter Most*, suggests that adults tend to think their accomplishments should shield them from the "supposed indignity of physical dependence. "This is an illusion," he states (2004, pp. 90–91). He believes that people are inherently dignified, that physical dependence does not detract from their dignity, and that people needlessly suffer from that self-belief. He suggests that caregiving fills a need for the caregiver, as well as meeting a need for the care receiver. He encourages the dependent person to allow and accept their family and friends to meet their need to provide care, making a reciprocal relationship—not just a dependent, or one-way, relationship.

Socialization

> "For true happiness, you've got to have companionship—other people . . . in your life. It doesn't have to be a husband or a wife. It can be a friend or, like us, a sister. . . ."
>
> —Sadie Delany (1994, p. 83)

Case Study 9-5

Marge had been cancer-free for 10 years after her breast cancer, mastectomy, and chemotherapy treatments. She continued to be treated for increasing Parkinson's symptoms, had been diagnosed with adult onset diabetes, had fallen several times, and was hospitalized for agitation, restlessness, and inability to sleep. She was taking a variety of medications for her various ailments, including an oral hypoglycemic, and a combination of Parkinson's meds, antidepressants, and sleep aids.

During this time, family arranged for caregiving, per Bill and Marge's stated wish to remain at home and have care provided there at whatever level was required. These arrangements, over time, included a live-in caregiver, part-time paid care, cleaning support, cook, and variations of agency care.

Inconsistent with their desire to stay at home and contrary to their agreement to accept help as needed, Bill and Marge found something wrong with each aspect of care arranged by their family. Bill especially declined the need for care, denigrated Marge's depression and physical needs, found fault with each caregiver (e.g., body odor, weight, cooking ability, culture) and made life so miserable that Marge would agree to his demands, fire the help, and join him in joint resistance to their family's recommendations about an acceptable level of care at home. They did agree and participated in a telephone emergency response system, with their two local daughters as responders.

Bill and Marge each had regular medical appointments to monitor their medical needs. They usually agreed to have a daughter present to take notes, discuss issues, help listen to the doctor, and record recommendations and follow-up required. Marge had progressive difficulty with Parkinson's symptoms, including restless leg syndrome, which often kept her awake at night and frequently restless during the day. The complexity of her medical conditions—now including diabetes, Parkinson's, depression, arthritis in her back, macular degeneration, and dizziness—necessitated a variety of medications. She was being seen by an internist, neurologist, audiologist, retinologist, and oncologist for periodic follow-ups. Each was prescribing medications and/or treatments for their primary diagnosis, sometimes changing each other's medications or dosages without consultation with the other.

Marge was hospitalized with an exacerbation of her restlessness, sleeplessness, and depression. Her neurologist ordered a medication evaluation and diagnostic testing, and referred her to a psychologist from a sleep clinic for

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evaluation and recommendations. Following this evaluation, Marge and her family decided to consolidate her care with one physician—the internist—with referral to specialists only as needed. He managed coordination of care and medication balance.

Bill was diagnosed with Alzheimer-type dementia during this period of time, but continued to deny thinking and memory problems. He again was forced to give up driving, after several episodes of heading for the familiar grocery store in their town, but not returning home for several hours. This re-created much of the unpleasant scenario of prior years when driving was an issue for Bill and his family.

Family often suggested assisted living or senior apartment living where there would be help available as needed, plus more socialization opportunities for Marge. Bill and Marge continued to deny the need for both, and Marge would often tearfully declare their intention to remain at home through the remainder of their lifetimes. Bill and Marge continued to refuse full-time help in their home, but did agree to a cleaning lady every other week, and eventually to 3–4 hours of caregiver help per day to include cooking, dishes, and laundry. Bill continued to deny the need for the cooking assistance, and often refused to eat the food prepared for his diabetic wife. Instead, he would prepare and eat a pound of salad for breakfast and lunch, and consequently became anemic. Bill withdrew more from outside interactions—including church, which had always been important to him. He would often go for days without much conversation with Marge, which then increased her sense of isolation. She was taking several medications for depression, and tried another stint at counseling, which was again short-lived because of Bill's negativity toward Marge, the psychologist, and the concept.

Critical Thinking: What options existed for Bill and Marge? How much should their personal preference weigh in the decisions made about their safety and care? How do you know when it is time to step in and invoke the health care representative role that has been designated in advance directives?

Personal Reflection: As a family member attempting to help Bill and Marge make wise and informed decisions about meeting their care needs, what additional information do you need? How much do you push when you think they are making unsafe or unwise choices?

Case Study 9-6

Bill had experienced several TIAs over time and had a larger stroke (CVA), which resulted in hospitalization. By this time he was more frequently incontinent, forgetful, continued to lack in personal care, and was emotionally very demanding on Marge, who was now physically unable to do the personal care that he required. The decision was made to place Bill in a skilled nursing facility for rehabilitation following the CVA hospitalization. Bill quickly regained his speech ability, could move all his extremities, and with PT assistance was able to regain walking with a walker. He remained incontinent, confused, and forgetful much of the time. Marge soon decided that living alone in their townhome was no longer feasible and consented to a move to senior apartment housing across the parking lot from Bill's ECF.

Critical Thinking: As a facility nurse, what accommodations in care planning should be made to reflect Bill's desire for independence, even as he must accept more and more levels of care?

> "By now, we've outlived just about everyone we used to know, so many of our friends are much younger than we are. That doesn't matter as long as you care about the same things and, just as important, if you have the same sense of humor. And you know what? Younger people can teach you a lot. They can keep you up to date. So we'll take 'home folks' wherever we find them!"
>
> —Sadie Delany (1994, p. 84)

Relationships provide the structure for social support and connections. These social networks remain important for the elderly, even as physical changes may limit their participation in the network and the network itself may shrink due to the loss of some of its members. Primary relationships are usually with family. For the elderly, these relationships usually provide cross-generational affection and assistance—highly valued evidence of concern and encouragement. As family becomes less available, relationships may be merged with friends and cohabitants of residential facilities.

Socialization is impacted by living arrangements. About 95% of the older adult population lived independently in 2000, of whom about 73% of men and 41% of women lived with their spouse. Several hundred thousand also had grandchildren in their household (ADA, 2002).

Socialization also impacts nutritional intake. Healthy individuals have better food intake—up to 44% greater—when eating with others instead of eating alone (ADA, 2002).

> ". . . I cherish most . . . the family traditions, all those little rituals that bind you together . . . like eating meals together, that keep you close. . . . They think it doesn't matter. Well, they're wrong! . . . It was comforting and it was fun."
>
> —Bessie Delany (1994, pp. 19–20)

Case Study 9-7

Marge's Parkinson's diagnosis limited her ability to walk distances, so she obtained an electric motorized cart to cross the parking lot to visit Bill at his facility. She often took their pet bird to visit him—much to the delight of other residents in his unit.

Marge continued to manage her medications with family help, and adjusted appropriately to the community living arrangement of her senior apartment complex. She occasionally fell—usually when trying to do a physical activity beyond her capacity. One fall resulted in two fractured ribs, with two ER visits for pain and shortness of breath. Over the course of a month, Marge had increasing shortness of breath, and was hospitalized when x-rays showed that she had fluid around her lung. This was drained with immediate improvement in her lung function. She was sent home with an incentive spirometer (breathing practice machine), pain medication, and orders to use a walker at all times. She also had orders for home nursing care for physical therapy, teaching, and bathing assistance for a few weeks.

Critical Thinking: As Marge's home care nurse, what would your plan of care for her include?

Psychosocial and Spiritual Influences

> "You know, when you are this old, you don't know if you're going to wake up in the morning. But I don't worry about dying, and neither does Bessie. We are at peace. You do kind of wonder, when it's going to happen? That's why you learn to love each and every day, child."
>
> —Sadie Delany (1993, p. 205)

Spirituality is more than the response to a religion or set of beliefs. It relates to the core of the person's being and his or her connection to the universe. Ultimately, it has to do with one's meaning and purpose in life. As seniors review their lives—often in the presence of disease, disability, and perhaps impending death—their questions may reflect these issues: "Who am I? Did, or do I make a difference? What is next? Can I handle getting old? What will become of me?" (Taylor, 2001, p. 1). These are *spirit-oriented* questions, which may indicate a spiritual searching. This searching should be taken into account when helping the patient to identify and achieve his or her goals (Taylor, 2001).

> *People who are facing potentially long-term or debilitating illnesses, confronting acute health crises, or suffering from loss and grief may find themselves re-examining the foundational beliefs they have held since childhood. Usually, at no other time in a person's life is he or she so focused on evaluating the spiritual self than during such crises. . . . (Mauk & Schmidt, 2004, p. 2)*

Ira Byock further encourages resolution of any personal, emotional, and spiritual issues while there is time and opportunity to do so, with the simple but most profound phrases of ". . . please forgive me . . . I forgive you . . . thank you . . . I love you . . . " (Byock, 2004, p. 3)

A Duke University study supported by the National Institute of Aging found that in the over-65 population, people who attend religious services regularly (once or more per week) had a lower incidence of chronic health problems, disabilities, depression, and smoking and alcohol use. They also tended to have less anxiety, lower blood pressure, fewer strokes, fewer suicides, and less depression and substance abuse than less regular attendees. And they tended to live longer, with a 28% lower chance of dying in the next 6 years (Koenig, Hays, & Larson, 1999).

Stress management may be an issue for the elderly, especially as their capacity for adaptation is taxed, at a time when uncontrollable changes may be occurring in their care needs and living circumstances on a regular basis. Some stress management strategies that are effective for other age groups might also be appropriate for the elderly. Being in tune with one's feelings is a starting point from which expression of emotions might be appropriate. Others include exercise, prayer, deep breathing, daydreaming, progressive relaxation, design of a quiet environment, meditation or guided imagery, and developing a clear understanding of the person's goals (vs. being the goals of others in their environment).

Goal Attainment

> "You can't change the past, and too many folks spend their whole lives trying to fix things that happened before their time. You're better off using your time to improve yourself."
>
> —Sadie Delany (1994, p. 19)

> "Pride in a job well done is the one kind of pride God allows you to have. I earned that pride. Nothing brings more satisfaction than doing quality work, than knowing that you've done the very best you can. Reach high!"
>
> —Bessie Delany (1994, p. 39)

Old age is often associated with problems involving health and loss of functional ability. Nurses and other health care providers who care for the elderly in any capacity are frequently challenged to promote and maintain quality of life for the persons they serve. However, a goal of their care can rarely be defined as freedom from disease. Rather, we can "help patients to live as good a life as possible, despite their illnesses and decreasing capacities" (Sarvimaki & Stenbock-Hult, 2000, p. 1026). Sarvimaki and Stenbock-Hult's Finnish study to evaluate quality of life in old age found that people who were studied—those who lived in the community—"generally viewed their life as meaningful, intelligible and manageable . . . and seemed to have a strong sense of value or self-worth in terms of self-esteem" (p. 1032). Patients of other cultures and residential settings may have different responses; however, the patient of any culture or in any setting can provide strong clues as to what contributes to his or her own quality of life and goals. These clues can then be incorporated into development of activity programs and exercises.

Maximizing Function

Preventing Complications of Existing Illness or Disease

> "So you want to live to be 100. Well, start with this: No smoking, no drinking, no chewing. And always

Case Study 9-8

After some difficulty in comprehending why he could not live in the same place as Marge did, and after weeks of perseveration in this thought, Bill adjusted to life in the facility better than anyone in his family had hoped. After moving from the rehab unit to the general population, he responded well to one of the aides, and his humor and personality began to show through his dementia on occasion. Although his dentures were lost, and he refused to cooperate in obtaining and adjusting to new ones, he ate well and gained 10 pounds in his first 3 months in the facility.

Family took him for outings and visited frequently, but after two visit attempts no longer took him to Marge's apartment across the parking lot. It was too confusing to him, and would reemphasize for him the fact that he and his bride of 63 years were not living in the same place. He participated in a few activities—mostly the weekly church services and bus trips to the local superstore, the county fair, and to see holiday lights around town.

He would voice much concern about Marge's health and her falls, insisting he could take care of her, and lecturing her on the need for safety. His dominant role in their relationship was a difficult one for him to relinquish.

After almost a year at the ECF, Bill had another episode of ischemia that caused him to have difficulty walking. Although he regained some strength after another round of physical therapy, his sense of taste had changed drastically and nothing tasted good to him—not even his favorite chocolate shakes or candy bars. Over the course of a month, he lost nearly 25 pounds. Family was asked to consider feeding options. They declined a feeding tube, based on Bill's age of 88, his living will advance directive, and the history of many conversations among Bill, Marge, and other family members. When influenza spread throughout the facility, Bill was unable to withstand the virus, and as Bill's condition quickly deteriorated, family agreed that hospice care would be appropriate. Bill was transferred to the local hospice facility instead of being hospitalized, and he died very peacefully 3 days later with Marge and three daughters at his side.

Critical Thinking: What other options were available to Bill and his family after he caught the flu? As a facility nurse, and knowing Bill for almost a year, what would have been your recommendations to family for choices of treatment, had they asked you for input? What would you have told the other residents who asked about Bill after he left the facility?

Personal Reflection: Do you think there was any ethical question about not treating Bill's influenza? Consider

and discuss quality-of-life issues that might have affected Bill's life and his family's decisions on his behalf, when he could no longer make them.

> clean your plate. Well, you can drink a little bit, but not much!"
>
> —Sadie Delany (1994, p. 11)

Several factors play a role in successful aging. In addition to the discussion in this section, assessment and screenings are described in Chapters 7 and 10.

Nutrition

> "We try our best to preserve our health, and one way we do it is to watch what we eat and drink. We start our day by drinking a full glass of water, followed by a teaspoon of cod liver oil and a whole clove of garlic . . . we wash it down with one glass of cold water, then one glass of hot water."
>
> —Bessie Delany (1994, p. 107)

> "It's important to eat healthy, but you won't live a long time unless you indulge yourself every once in awhile!"
>
> —Sadie Delany (1994, p. 114)

Physical and mental decline are not necessarily a normal part of the aging process. They can be affected, however, by the person's nutritional status, because nutrition is one of the major determinants of successful aging (**Figure 9-1**). "Elderly patients with unintentional weight loss are at higher risk for infection, depression and death." (Huffman, 2002, p. 640). Some causes of involuntary weight loss are depression, cancer, cardiac disorders, gastrointestinal disorders, medications, polypharmacy, and changes in psychotropic medication (Huffman, 2002). Weight loss can also be an indicator of malnutrition or other acute medical conditions. Diagnosis of nutritional problems and appropriate intervention can prevent loss of function and independence (Ennis, Saffel-Shrier, & Verson, 2001). Helpful tips are noted in **Box 9-2**.

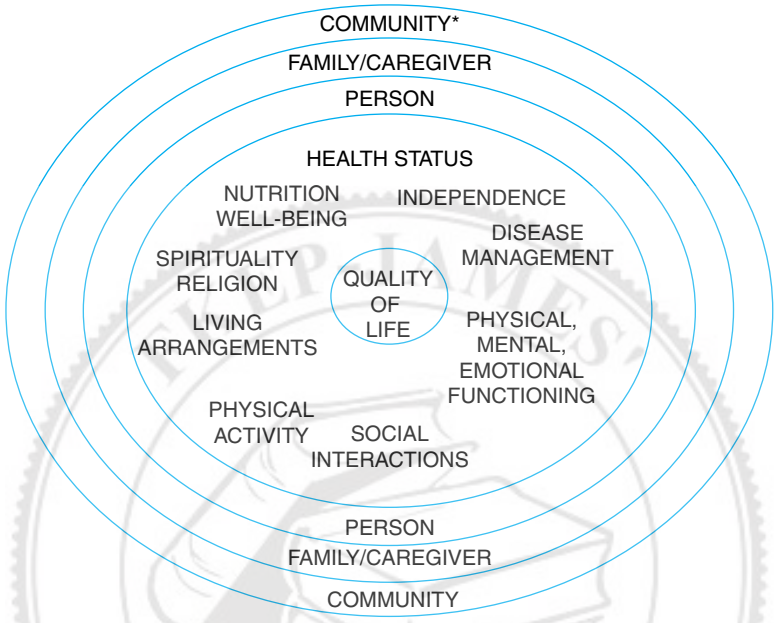
Sleep

Although sleep patterns often change as one ages, waking up tired every day and disturbed sleep patterns are not considered a part of normal aging. Adequate sleep is essential to good health and to quality of life for all persons, including the elderly. Poor sleep contributes to a variety of problems including depression, attention and memory deficits, increased falls at night, increased use of medication to enhance sleep, and daytime sleepiness —all areas of increasing difficulty anyway for elderly folks. Poor sleep can exacerbate these conditions and may be increasingly problematic as a person ages (Dailey & Cravedi, 2005).

Afternoon naps may help restore energy in the elderly (Gaspar, 1998). Other interventions that may help promote sleep include:

- Listening to classical or relaxing music at bedtime to promote relaxation
- Exposure to at least 2 hours of sunlight or bright light during the day
- Bedtime routine (per the patient, not a facility)
- Reduced noise levels at night
- Progressive whole-body relaxation techniques
- An individualized plan for each person

Figure 9-1 Factors that influence the quality of life of elderly adults.



Source: American Dietetic Association. (2005). Nutrition across the spectrum of aging. *Journal of the American Dietetic Association, 105*, 616–633.

- Medication used as a last resort (Gaspar, 1998)

Exercise

"We get up with the sun, and the first thing we do is exercise. God gave you only one body, so you better be nice to it. Exercise, because if you don't, by the time you're our age, you'll be pushing up daisies."

—Sadie Delany (1994, p. 11)

"There's another thing I make Bessie do that she doesn't like too much, and that's exercise. You've got to exercise, not just for your heart and lungs, but to keep from stiffening up. It keeps you limber, and that's important when you get older."

—Sadie Delany (1994, p. 109)

Participation in a regular exercise program has many benefits for elderly individuals. There are benefits for those with health-related issues such as cardiovascular disease, diabetes, and osteoporosis as well as functional benefits that allow for ongoing independence and activities of daily living. However, *regular* exercise programs are the key to ongoing positive outcomes. Challenges for nurses and other health care professionals in influencing the exercise capacity of the elderly have to do with education about exercise's ongoing

Box 9-2 Nutritional Tips for Older Adults

- Eat breakfast every day.
- Select high-fiber food like whole grain breads and cereals, beans, vegetables, and fruits.
- Have three servings of low-fat milk, yogurt, or cheese a day. Dairy products are high in calcium and vitamin D and help keep your bones strong as you age. Or take a calcium and vitamin D supplement.
- Drink plenty of water. You may notice that you feel less thirsty as you get older, but your body still needs the same amount of water.
- Ask your health care provider about ways you can safely increase the amount of physical activity you do now.
- Fit physical activity into your everyday life. For example, take short walks throughout your day. You do not have to have a formal physical activity program to improve your health and stay active.
- Get enough sleep.
- Stay connected with family, friends, and community.

Source: Weight Control Information Network, National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). http:// win.niddk.nih.gov/ publications/young_heart.htm#whatis

importance, as well as designing interventions that will increase adherence and compliance with these exercise programs (Mazzeo & Tanaka, 2001).

Basic guidelines for designing exercise programs for the elderly focus more on health and functional capacity than on aerobic fitness. Balance and gait are important aspects of assessments in older adults (see Chapter 7). Interacting elements of an exercise program include:

- *Warm-up:* Gentle stretching of muscles and light movement simulating the actual exercise activities.
- *Low to moderate intensity levels:* To avoid injury and to promote improvement in cardiac risk factors (adapted to tolerance and preferences).
- *Duration:* A longer duration of lower intensity is recommended over the reverse for a minimum of 30 minutes per day; 10 minutes, three times per day is also effective. Gradually increase the duration rather than the intensity.
- *Frequency:* Ideally low to moderate exercise every day (or most days) of the week; for intense exercise, reduce the frequency.
- *Mode/type of exercise:* Should be based on the participant's fitness level and reflect his or her interests and available resources; walking, cycling, or swimming may be appropriate. Exercise facilities/fitness clubs offer a range of activities that can be combined into one workout (Mazzeo & Tanaka, 2001).

Exercises in water (aquatic therapy) are effective in improving balance and increasing strength and range of motion, especially for those persons with arthritis. The relative density of the person and the water and resulting buoyancy make the flexibility and mobility exercises easier, more effective, and less painful. These benefits then improve the person's balance and stability, which, in turn, helps in reducing falls (Suomi, 2001).

Box 9-3 Additional Resources

Delany, S., & Delany, A. E. with Hearth, A. H. (1993). *Having our say: The Delany sisters' first 100 years*. New York: Kodansha America. The Delany sisters have a lot to say about being an older American!

Brennan, F. H. (2002). Exercise prescriptions for active seniors. *The Physician and SportsMedicine, 30*(2). Available at http://www.physsportsmed.com/issues/2002/02_02brennan.htm. Accessed May 20, 2005. These tools help identify exercise goals, suitability for initiating an exercise program, and evaluate risks for such a program.

National Center for Chronic Disease Prevention and Health Promotion. (2004). *Healthy aging: Preventing disease and improving quality of life among older Americans*. Available at http://www.cdc.gov/aging. Accessed April 18, 2005. This site provides timely and practical information to health and aging professionals and the public.

National Institutes of Health. http://www.nihseniorhealth.gov. Aging research at the federal level.

Although home exercise programs are helpful, supervised exercise training in a structured, physical therapy–type environment was found to be more beneficial in older physically frail community–dwelling adults. The formalized training reduced physical impairments and improved functional limitations more than the unsupervised home exercise programs. Its benefit was suggested to be "the prevention or postponement of frailty that is severe enough to cause loss of independence" (Binder et al., 2002, p. 1926). The additional socialization of a formal program, as well as the proximity of the university medical center setting, were thought to be additional benefits in this study.

Perhaps more practical, especially for residents of facilities—including assisted living facilities where a study was completed—might be a resident-led walking club. The socialization inherent in such a program helps motivate the participants, which improves compliance. Participation was voluntary. Daily participation and the distance goals were established by each resident depending on their physical status and endurance. A significant increase in each pretest measurement was noted. Residents found the experience pleasurable, a means to manage current health problems (e.g., arthritic knees), and noted positive physical and emotional benefits from the walking activity (easier to get in and out of an automobile, improved feeling of stability). The program produced benefits for the residents, and required little from the facility in the way of management and staff time (Taylor et al., 2003).

Yoga for exercise or rehabilitation is also appropriate for the elderly. Rather than focusing on the stereotypes of bizarre body positions and Eastern religious practices, the focus should be on the measurable physical and health benefits that result from prolonged practice of the tradition. Over time the practice of yoga, through emphasis on postures, breathing and meditation, and simple body movements done with mindfulness, can result in increased strength, balance, stamina, flexibility, and relaxation—all areas needing attention by the elderly person (Taylor, 2001).

Figure 9-2 Exercise prescriptions for active seniors.

Name: _____ Age: _____ Date: _____/_____/_____

I. Mode of Activity ☐ Jogging ☐ Water aerobics ☐ Rowing ☐ Walking
☐ Cycling ☐ Swimming ☐ Racket sports ☐ _____

II. Duration ☐ 20 minutes ☐ 40 minutes ☐ _____ minutes

III. Frequency _____ times a week

IV. Intensity ☐ low ☐ moderate ☐ vigorous

Low-intensity exercise: < 40% Vo_2 max or Heart Rate Reserve (HRR) (Borg 10 = <40% HRR)
Moderate-intensity exercise: 40% to 60% Vo_2 max or HRR (Borg 13 = 60% HRR)
Vigorous-intensity exercise: >60% Vo_2 max or HRR (Borg 16 = 80% HRR)

Calculating Cardiovascular Training Zone:

A. Calculate patient's maximal heart rate (Max HR),* 220 − age in years = Max HR = _____beats per minute (bpm)
B. Take patient's resting heart rate (RHR) and record = _____ bpm
C. Heart Rate Reserve (HRR) = maximum heart rate − resting heart rate = _____bpm
D. Estimate cardiovascular training zone = HRR × % intensity (e.g. 40%) + RHR = Target Heart Rate in bpm
E. Cardiovascular training zone: Try to keep the heart rate within 10 bpm of the calculated number.

*Consider buying a heart rate monitor as a guide.

V. Progression of Conditioning

☐ Initial Phase
☐ Duration: 4 to 6 weeks
☐ Goal is to increase frequency, proper form, and form "good" habits

☐ Improvement Phase
☐ Duration: 4 to 6 months
☐ Goal is to increase duration and intensity of exercise

☐ Maintenance Phase
☐ Occurs after 6 months
☐ Goal is to maintain cardiovascular fitness while avoiding overuse injuries

Borg Relative Perceived Exertion Scale

6		
7	Very, very light	Low intensity
8		
9	Very light	
10		
11	Fairly light	
12		
13	Somewhat hard	Moderate intensity
14		
15	Hard	
16		
17	Very hard	Vigorous intensity
18		
19	Very, very hard	
20		

VI. Special Precautions

Coronary heart disease _____
Diabetes melitus _____
Osteoarthritis _____
Asthma _____
Pulmonary disease _____
Obesity _____
Chronic illness _____
Other _____

VII. Follow-up Appointment

Primary Care Provider: _____
Office Phone Number: _____

A cardiovascular exercise prescription worksheet can help providers with an exercise prescription for geriatric patients. This form also allows documentation of other conditions that might influence exercise and provides space for scheduling follow-up appointments.

Fall Prevention

> "When you get old, everyone starts to worry about you. They say 'Don't do this, don't do that.' It drives us plumb-jack crazy. Bessie always says, 'If I break my fool neck falling down the stairs while I'm feeding my little dog, well, so be it.' Folks think that because you're old, you're unable to do for yourself. Well, look at us! . . . But you do have to be honest about your limitations. If you don't do that, well, your clock's not ticking right!"
>
> —Sadie Delany (1994, pp. 119–120)

Numerous studies have determined the importance of evaluation of risk factors for falls, and the impact of physical decline and performance changes. Prevention of falls must take into account the living situation of the elderly person. Those elderly with a more vigorous functional capacity usually fall due to hazards in their home (e.g., storage problems, clutter, scatter rugs). Falls for the frail elderly are not necessarily related to home hazards, but rather tend to relate to functional changes (e.g., poor depth perception, arthritis). Home modifications should be in place before the person becomes frail (Northridge & Levick, 2002).

Home interventions, which use home visits and a standardized checklist by a team of nurses, therapists, and a social worker, can be helpful in evaluating the potential environmental hazards that might contribute to falls. Suggestions of possible changes to the environment, facilitation of modifications, and training in the use of adaptive equipment were helpful in reducing the number of falls in a group of frail elderly with a history of falls. However, modifications to the environment alone were not sufficient to make the difference. Compliance with the physical changes as well as with the suggested behavioral changes was also important (Nikolaus & Bach, 2003).

Evaluation of physical performance measures may provide easily accessible screening for future risk of hospitalization and estimation of decline in health and function for older adults. Gait speed, chair rise, and balance evaluations provided information that led to prediction of emerging difficulty in physical care and a decline in physical function. Performance measures alone, or in combination with self-report measures, were able to predict outcomes more than self-report alone, suggesting the increased use of performance measures as an additional "vital sign" for health-related risk in older adults (Studenski et al., 2003).

Strength (defined as the ability to exert force) is less of a predictor of positive outcomes than muscle power (defined as the ability to exert force quickly). Leg power has been correlated with gait speed, chair-rise time, and stair-climb time. Leg power is a better predictor of physical performance than is leg strength, as studied in community-dwelling, mobility-limited people (Bean et al., 2002).

Technological advances in the medical field have yielded the ability to assess patients for fall risk. Screening and medical products for diagnosing and treating dizziness and balance disorders, which identify those at greater risk for falls due to these causes, are becoming available to physicians, clinics, and facilities for treating the elderly (Physician Compliance Wire, 2002).

Value of Rehabilitation

> "That's a big problem with some older folks—they have such low

> expectations of themselves. When they get to a certain age, they just give up. That's a shame! If there's anything I've learned in all these years, it's that life is too good to waste a day. It's up to you to make it sweet."
>
> —Sadie Delany (1994, p. 123 [after fracturing her left hip])

A decline in quality of life is not necessarily inherent as physical frailty increases with age. Therefore, rehabilitation goals and interventions that affect the outcomes patients may expect to achieve can be developed to optimize each patient's quest for holistic growth. Because medical personnel and family members often place a higher regard on physical problems than the patients themselves do, and because aging is often seen as the functional losses that occur near the end of one's life, rehabilitation goals are frequently established simply to minimize the progressive losses of function. Rehabilitation goals may also affect one's spirituality and quality of life, in that the elderly may wish to overcome their limitations in search of a wholeness unique to the wisdom, meaning, and life satisfaction they experience. A negotiation of goals to meet the wishes of the elderly patient may provide the most meaningful rehabilitation program for the individual (Johansson, 2003).

Many factors influence the rehabilitation potential of the geriatric population. Coping strategies such as the desire to be in control are helpful, whereas feelings of stress, fear, and anxiety can lead to the helpless feeling of *not* having control. Returning control to the person in whatever way possible—whether in physical capacities or in a sense of control over one's future—is important in promoting the concept of self-care. Spiritual well-being—manifested, by some, through prayer and a voiced belief in God—is also a strong component in successful coping (Easton, 1999). Positive social support, providing a sense of stability, security, social interaction, and connectedness, is also important and is associated with better physical outcomes of rehabilitation. Negative social support may undermine the necessary emotional or physical support for the rehab process, and may impair it by negative attitudes toward the person's goals. Family members may also be affected by aging and disability, so family dynamics, resources, and coping strategies should also be considered when evaluating the support systems of the person in rehab. Motivational factors, including goals, humor, caring, encouragement, and power resulting from relationships, were found to be much more motivational than forced compliance or domination.

Self-efficacy, or the degree of confidence possessed by the person that he or she will be successful in performing certain acts, is also important to the success of a rehab program. Self-belief is a powerful predictor of ADL performance months after stroke rehab program completion, indicating the value of incorporating self-efficacy into the assessment and treatment phases (Hellstrom, Lindmark, Wahlberg, & Fugl-Meyer, 2003).

The need for preventive and rehabilitative interventions is particularly important for the oldest-old. Following hospitalization for medical illnesses, the older the patient, the more likely he or she to lose ADL function during the course of hospitalization. More than half of those over 85 years had worse ADL function following a hospitalization. Discharge outcomes were markedly influenced by the functional changes after the hospital admission. This outcome suggests that functional status of the elderly during

hospitalization needs to be monitored to promote as much function as possible, in order to maintain as much function as possible following discharge (Covinsky et al., 2003).

Some studies also indicate that elderly stroke patients who have rehabilitation services at home instead of in the hospital have lower rates of certain medical complications, achieve a better score for rating of depression, and experience lower rates of admission to nursing homes (Bo et al., 2004).

Use of and Alternatives to Restraints

Restraint devices (belts, vests, pelvic ties, mitts, specialized chairs, bed side rails) are usually used to promote the safety of the recipient—especially those who are forgetful and unsteady. Defined as "any manual method or physical or mechanical device, material or equipment attached or adjacent to [the resident's] body that the individual cannot remove easily which restricts freedom of movement or normal access to one's body." (Department of Health and Human Services, 1999).

Physical restraints are those applied to the body and a stationary object; chemical restraints are those provided by a medication of some type. It is the restriction of freedom that makes the restraint what it is, whether physical or chemical. Wandering, agitation, lashing out at others, unsteadiness and potential to fall, and pulling at tubing or needles have been common reasons for use of restraints. Because restraints also have the potential for causing falls, injury, or even death and because quality-of-life issues may be affected, there are protocols and stringent rules governing their use. The Omnibus Reconciliation Act (OBRA) mandates that restraints may be used only to treat someone's medical condi-

Box 9-4 Alternatives to Restraints

- Personal strengthening and rehabilitation program
- Use of personal assistance devices such as hearing aids, visual aids, and mobility devices
- Use of positioning devices such as body and seat cushions or padded furniture
- Safer physical environment design, including removal of obstacles that impede movement, placement of objects and furniture in familiar places, lower beds, and adequate lighting
- Regular attention to physical and personal needs, including toileting, thirst, hunger, socialization, and activities adapted to current ability and former interests
- Design of physical environment for close observation by staff
- Efforts to increase staff awareness of person's individual needs, including assignment of staff particularly to the person, in an effort to improve function and decrease difficult behaviors
- Living environment designed to promote relaxation and comfort, minimize noise, provide soothing music, and maintain appropriate lighting
- Provision of massage, art, movement activities and complementary therapies (e.g., Healing Touch, energy work)
- Use of bed, chair, and door alarms to alert to the need for assistance

Source: Minnesota Department of Health. (2001). http://www.health.state.mn.us/divs/fpc/safety.htm

tion, and not for convenience or discipline. Symptoms can be emotional, physical, or behavioral and a danger to the person themself or other people (Frey, 2002).

Providing safe care for those with physical and mental limitations is an important concern. There is now convincing evidence that safe care can be provided without unduly restricting freedom and without creating other unnecessary risks (**Box 9-4**). Alternative safety measures, tailored to the individual's specific needs, can help ensure the patient's best possible quality of life (Minnesota Department of Health, 2001). Family members and caregivers may have specific insights that are helpful in determining the patient's habits, likes and dislikes, patterns of behavior, and overall condition. These insights can be used to develop an individualized plan to minimize behaviors that lead to use of physical restraints (see Chapter 12 for further discussion). Restraint reduction should be done methodically, including a planned substitution of alternative, less restrictive measures to treat the specific symptom with ongoing monitoring and revision as the plan unfolds (Cooper, 2000).

Financial Considerations

Financial resources affect the options available to meet the needs of the elderly. Those with adequate finances have a full range of possibilities open to them for housing, location, and care resources. Others with modest but limited resources can take advantage of a variety of options until their funds are depleted, and then

Case Study 9-9

After Marge had been widowed for about 3 months, she visited her primary physician for a general checkup. She admitted to feeling some guilt about her grief, or apparent lack of it. She related her belief that her life has not changed much since Bill died, as she continued to have her new friends and activities of the past year in her senior apartment complex. She also said she didn't really miss going to see him every day or two—that she felt their "relationship really ended when he got so mad and ugly after he couldn't drive anymore." She was tearful in relating these feelings. Her appearance was good; she had lost some weight (which she attributed to her inability to eat when she was short of breath after her broken ribs) and seemed to have a bit more energy than at previous visits.

Critical Thinking: As the office nurse in whom Marge is confiding, what is your reaction? How do you respond to Marge's verbalization of guilt? How does her response correspond with your understanding of the grieving process? If Marge had died first, what do you think Bill's grief reactions might have been?

Personal Reflection: Do you think Marge's guilt is realistic? Justified? How might various aspects of their relationship affect Marge's grief?

must rely on family or government programs to meet their care needs as they continue to age.

For those with few resources, community and government programs are available to meet needs, and more are developing to meet the anticipated needs of the baby-boomer generation, which is now maturing to older adulthood. Some programs to assist the elderly who have moderate/severe financial limitations include Medicaid waiver, CHOICE, supplemental food banks, food stamps, and assisted living caregivers.

Community Resources

> "Don't be too proud to accept your limitations. The hardest thing is discovering that you can't do everything the way you used to. We're not happy having folks help us around the house, but we've come to accept it. But make sure you hire folks to do what you want. It's still your house, and you're still the boss!"
>
> —Sadie and Bessie Delany (1994, p. 126)

There are many community resources of which nurses should be aware. The yellow pages and some sections in the front of the telephone book may help. Many areas have resource guides published by the community United Way or other organization. Look for resources such as these:

- *Geriatric case management:* Provides coordination of care and community resource referrals, either through a public agency such as a council on aging or through an entrepreneurial agency
- *Senior transportation options:* Must be available and senior friendly
- *Meals on Wheels, food stamps, senior center meals, etc.:* Government or locally sponsored programs; some have low-cost or subsidized funding
- *Caregiver associations and support groups:* National via the Internet; local via social service agencies
- *Respite care agencies*
- *Daycare services for seniors*
- *Hospice and palliative care programs:* Through nursing agencies or hospitals
- *Disease-specific support groups and associations:* National or local chapters
- *Eldercare agencies*
- *Health Care Financing Agency (HCFA):* Medicare, Medicaid
- *Medicaid waiver programs:* Subsidized home care support; financial criteria for eligibility
- *Local/community health clinics*
- *Medication assistance programs:* Through the medication manufacturer, with the cooperation of the physician or medical care provider

Implications for Nursing Care

Nurses in a variety of practice settings have a great opportunity to impact the lives of community-based elderly patients. In the doctor's office, the nurse is usually the first to talk with the patient on a visit. While taking vital signs, the nurse can begin to evaluate eating, sleeping, and socialization factors that might be influencing the patient's condition and ability to remain independent. The nurse can ask about telephone use, social supports, activities, and involvement in the community. If caregivers are present at the appointment, the nurse can ask about patient management, coping mechanisms, and need for respite or relief.

The hospital nurse can also look for and discuss with families/caregivers the safety issues and functional needs and abilities to be considered before a patient is released home (Rose, Bowman, & Kresevic, 2000). Referral to the social services department can provide education, counseling, and links to community resources for the patient/caregiver.

Specialty nurses in the clinic, office, or hospital can be on the lookout for those patients/families who might benefit from support groups or other referrals particular to their diagnoses or conditions.

Visiting nurse services offer in-home care and support, therapies, and social services that are designed to keep patients functional and community-based for as long as possible. Whatever the setting, nurses may act as resources for older persons to promote continued independence into later life.

Personal Reflections

1. In what practice setting do you, as an individual, think you can most positively impact the elderly patients you encounter? Why?
2. Do you have experiences with elderly family members who have influenced your decision to become a nurse? Elaborate on the personal lessons you have learned from your elderly family members in making your career choice.

> "But however you do it, you've just got to fight in this life. When you're young, you're busy trying to fight against all the big problems of the world. When you're older, you have to fight to hold on to things like your property and your dignity and your independence. If there's one thing you've got to hold on to, it's the courage to fight!"
> —Bessie Delany (1994, p. 125)

3. Read the quote above. Do you agree with the Delany sisters' outlook about fighting throughout life? Why or why not?

Glossary

Basic activities of daily living (BADLs): Functions involved in maintaining personal/physical care

Frailty: General decline in the physical function of older adults

Functional ability: Personal capacity to maintain activities of daily living

Independence: Ability to care for oneself

Instrumental activities of daily living (IADLs): Functions involved in maintaining a household

Living skills: Ability to meet the tasks of daily self-care

Quality of life: Features that define a person's satisfaction with the circumstances of his or her life situation

Restraints: Any device, material, or equipment attached or adjacent to the body that the individual cannot remove easily and that restricts freedom of movement or access to one's own body

Self-care: Ability to meet one's own needs

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Section 4

Health Promotion, Risk Reduction, and Disease Prevention (Competencies 11–13)

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Chapter 10

Identifying and Preventing Common Risk Factors in the Elderly

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LEARNING OBJECTIVES

At the end of this chapter, the reader will be able to:

1. Discuss techniques for assessing and treating factors that lead to functional decline in the elderly.
2. Describe recommended screening evaluations for the elderly population.
3. Cite the expert recommendations for flu and pneumonia vaccines.
4. Identify risk factors and signs of abuse in the elderly.
5. Explain the protocol for reporting elder abuse.

KEY TERMS

- Activities of daily living (ADLs)
- Adult protective service agency
- Chronic Disease Self-Management Program (CDSMP)
- Contracting
- Dietary Approaches to Stop Hypertension (DASH) diet
- Framingham Heart Study
- Functional decline
- Health promotion
- Health screening
- Healthy People 2010
- Instrumental activities of daily living (IADLs)
- Nutrition Screening Initiative
- Primary prevention
- Secondary prevention
- Tertiary prevention
- U.S. Preventive Services Task Force (USPSTF)

Health promotion activities can help to prevent **functional decline** in the elderly. Scientific evidence supports the fact that functional disability is not caused by aging, per se, but results from illnesses and diseases that are related to unhealthy lifestyle decisions. Up to 70% of the physical disabilities associated with the aging process result from unhealthy behaviors or lifestyles (National Center for Chronic Disease Prevention and Health Promotion, 1999). This creates an exciting opportunity for nurses to improve the quality of life for the elderly client through evidence-based health promotion activities.

In this chapter, we will review the health promotion and disease prevention guidelines recommended by the following groups:

- **U.S. Preventive Services Task Force (USPSTF):** USPSTF was convened by the U.S. Public Health Service to systematically review the evidence of effectiveness of clinical preventive services. The task force is an independent panel of private-sector experts in primary care and prevention whose mission is to evaluate the benefits of individual services and to create age-, gender-, and risk-based recommendations about services that should routinely be incorporated into primary medical care (http://www.ahrq.gov/clinic/uspstfix.htm).
- **Healthy People 2010:** Healthy People 2010 is an initiative of the U.S. Department of Health and Human Services that utilized the skills and knowledge of an alliance of more than 350 national organizations and 250 state public health, mental health, substance abuse, and environmental agencies to develop a set of health care objectives designed to increase the quality and quantity of years of healthy life of Americans and to eliminate health disparities (http://www.healthypeople.gov/).

The recommendations presented in this chapter are guidelines for most patients, most of the time. Clinical judgment is used in applying these guidelines to individual clients (e.g. the risk and benefits of colonoscopy will be quite different for a healthy 75 year old versus a frail 75 year old with metastatic cancer). Individual variations in health status increase markedly with age, necessitating an individualized approach to health care.

Health Promotion and Disease Prevention

Definitions

Health promotion activities are those activities in which an individual is able to proactively engage, in order to advance or improve his or her health. **Primary prevention** activities are those designed to completely prevent a disease from occurring, such as immunization against pneumonia or influenza. **Secondary prevention** efforts are directed toward early detection and management of disease, such as the use of colonoscopy to detect small cancerous polyps. **Tertiary prevention** efforts are used to manage clinical diseases in order to prevent them from progressing or to avoid complications of the disease, as when beta blockers are used to help remodel the heart in congestive heart failure.

Screening

Health screening is a form of secondary prevention and will be a focus of this chapter. In

order to endorse screening for a specific disease, the USPSTF considers whether the disease occurs with enough frequency in a population to justify mass screening. The population is more likely to benefit from screening tests for a disease like diabetes, which occurs frequently, than it is to benefit from screening for Addison's disease, which is uncommon. In order to justify the costs and inconvenience of screening we must be able to detect the condition being screened at a relatively early stage and have effective treatments for the condition. Early detection of the disease has to result in improved clinical outcomes. The screening tests should be relatively noninvasive and acceptable to patients, cost-effective and available, and highly sensitive and specific.

Screening recommendations are graded by expert panels according to the strength of the supporting evidence and the net benefit. The USPSTF uses the following rating scale:

Level A: USPSTF strongly recommends screening based on good evidence that screening improves health outcomes and benefits outweigh screening risks.

Level B: USPSTF recommends screening based on fair evidence that health outcomes and benefits outweigh screening risks.

Level C: USPSTF makes no recommendation for or against screening because the balance of benefit and risk is too close to justify a general recommendation.

Level D: USPSTF recommends against screening because there is at least fair evidence that screening is either ineffective or harmful.

Level I: USPSTF makes no recommendation based on insufficient evidence or research.

Focus of Health Promotion Efforts

A major focus of health promotion efforts for the elderly is to minimize the loss of independence associated with illness and functional decline. Healthy People 2010 and the USPSTF suggest that nurses need to focus on the following areas

Box 10-1 Research Highlight

Aim: This longitudinal study examined the health benefits derived from participation in proactive health-promoting behaviors for independent-living elders, ages 72 and older.

Methods: Annual, in-home interviews were conducted over a 9-year period with 1,000 subjects in order to determine if health-promoting behaviors, reported at baseline, were positively correlated with quality of life 8 years later, at the termination of the study.

Findings: Exercise was found to improve performance on IADLs and increase lifespan and quality of life. Tobacco avoidance was correlated with improvement in longevity.

Conclusion: There is unlikely to be an upper age limit beyond which health promotion efforts are not helpful in improving quality and quantity of life.

Source: Kahana, E., Lawrence, R., Kahana, B., Kercher, K., Wisniewski, A., Stoller, E., et al. (2002). Long-term impact of preventive proactivity on quality of life of the old-old. *Psychosomatic Medicine, 64*(3), 382–394.

in order to promote health and prevent disability in the elderly client.

- Physical activity
- Nutrition
- Tobacco use
- Safety
- Immunization

Many of these foci show considerable overlap with recommendations for younger adults, but some, like injury prevention safety and hearing and vision screening (Table 10-1), are unique to older adults. It is important to consider the impact of health conditions on physical functioning and on quality of life in the older client. This is different from the younger adult's focus on treatment and cure of a single, acute condition. Multiple chronic illnesses are common in the elderly, and cure is often an unrealistic and inappropriate goal. These chronic illnesses can lead to disability and dependency. In fact, almost 15% of Americans over 65 years of age require help with bathing, dressing, meal preparation, or shopping. Symptoms that impact functional status should be the focus of interventions with this population. Maintaining

Table 10-1 Summary of USPSTF Screening Recommendations for Older Adults

Screening Test	Recommendation	Level of Evidence
Physical activity counseling	Physical activity has a positive impact on health but we don't know if counseling about exercise is effective in helping people to begin exercising.	Level I
Nutrition	Counseling clients with chronic illnesses about nutrition is beneficial. Information should be geared to the chronic illness.	Level B
Tobacco use	Screening is helpful in identifying tobacco use and counseling is effective in helping people quit smoking.	Level B
Safety	Falls can be prevented by medication monitoring, balance and strength exercises, and home safety evaluation.	Level B
Immunizations	Annual flu vaccine	Level B
	Pneumococcal vaccine once after age 65 and one-time revaccination for clients over age 75 who've not been vaccinated in 5 years	Level B
	Td vaccine every 10 years	Level A
Depression	Screening is effective in identifying depression and treatments are effective.	Level B
Dementia	Insufficient evidence to support mass screening of elders for dementia, but good evidence to suggest screening to follow up on family or client's concerns about memory loss.	Level I

Table 10-1 SUMMARY OF USPSTF SCREENING RECOMMENDATIONS FOR OLDER ADULTS (CONTINUED)

Screening Test	Recommendation	Level of Evidence
Alcohol abuse	Screening is beneficial and treatment is effective.	Level B
Elder abuse and neglect	No evidence that either screening or interventions are effective.	Level I
Lipids	Good evidence to support that treatment and screening are effective.	Level A
Hypertension	Good evidence to support that treatment and screening are effective.	Level A
Aspirin therapy	Good evidence to support aspirin therapy in clients at high risk for CV disease.	Level I
Cerebrovascular disease	Insufficient evidence for use of carotid ultrasound to screen for carotid stenosis as a CVA risk factor.	Level I
Thyroid disease	Insufficient evidence to support screening for thyroid disease.	Level I
Osteoporosis	Screening is recommended for all women over 65 years of age.	Level B
Vision and hearing	Hearing screening is recommended for older adults. Glaucoma testing by an ophthalmologist is recommended for adults at risk of developing glaucoma.	Level B
Prostate cancer	Insufficient evidence to recommend screening.	Level I
Breast cancer	Mammography is recommended every 1 to 2 years as a screening for breast cancer for older women.	Level B
Colorectal cancer	Screening for colorectal cancer by FOBT, sigmoidoscopy, or FOBT + sigmoidoscopy is recommended.	Level A

independence in **activities of daily living (ADLs)** is an important goal for health promoting activities.

By the time we are 85 years old, one half of our remaining years of life are expected to be lived dependently, often in a nursing home. About 2.3 million elderly Americans have some functional limitation, and half of elderly clients hospitalized for medical illness were found to have some deficiency in ADLs (American Academy of Family Physicians [AAFP], 2004). Some of the preventive strategies that will be discussed in this chapter, like smoking cessation, immunization, physical activity, weight control, blood pressure control, and arthritis and diabetes self-management programs, are known to be effective in lessening disability.

Assessment of functional status requires a multipronged approach. The ADL scale and the **instrumental activities of daily living (IADL)**

scale are valid and reliable self-report tools to assess functional status (Lawton & Brody, 1969). Nurses can use these instruments to identify elderly individuals who are frail and may benefit from an increased level of care or additional in-home support.

Fear of being advised to leave their home can cause elderly individuals to deny difficulties. The ADL and IADL scales rely on self-reporting and can fail to detect difficulties when clients are not forthcoming about their limitations.

Performance-based tools, like the Get Up and Go test (Duxbury, 1997), can provide a more objective measurement of functional status and fall risk. This assessment requires clients to rise from a chair, walk 10 feet, turn around, return to the chair, and sit down. These actions are timed and compared with a historic sample of adults without balance problems who were able to complete this test in under 10 seconds. Older adults who are dependent in most activities of daily living and have poor balance and gait may take more than 30 seconds to complete the task. Clients are observed for sitting balance, transfers, gait, and ability to maintain balance while turning. If a gait abnormality is detected, weight-bearing exercise and physical rehabilitation may prevent further decline and lessen the risk of falls.

Self-Management

What can nurses do to encourage clients to adopt health-promoting behaviors and manage their chronic illnesses? Kate Lorig, MD, has been instrumental in developing the concept of self-management and outlining the role of the health care provider in fostering the client's self-management of his or her chronic condition (Lorig, Holman, 2000). Her research, which was sponsored by the Agency for Healthcare Research and Quality (AHRQ), has supported the effectiveness of chronic disease self-management in preventing or delaying disability from chronic diseases. She has described how the self-management concept may be applied to health promotion activities, as well.

The **Chronic Disease Self Management Program (CDSMP)** is a 17-hour course for patients with chronic diseases that is taught by trained laypeople. The course goal is to teach patients to improve symptom management, maintain functional ability, and adhere to their medication regimens. The proven effectiveness of the intervention is, at least in part, attributable to the improved self-efficacy of clients who participate in the program. Clients come to believe that they can succeed in managing their illness and preventing disability.

Critical to the concept of self-management is an assessment of the client's goals and concerns, which may be different from the health care professional's goals and concerns. The nurse may feel that exercise will help lower her client's blood pressure, which may decrease stroke risk, certainly an important goal. The client's focus, however, may be that he does not want to go shopping for new clothes as a result of his recent weight gain, and his goal is to be able to continue to use his current wardrobe. He will assess the value of his new exercise program in terms of his clothing budget, not in relation to his blood pressure readings.

Lorig has identified five key elements of self-management programs: problem solving, decision making, resource utilization, forming a health care professional/client partnership, and taking action. In the problem-solving phase, a client may identify several barriers to initiating an exercise program and then list strategies for overcoming each barrier, to arrive at a workable

strategy. Decision making helps arm clients with the information needed to make the decisions they need to make on a daily basis: "How do I know when I am exercising too hard?" "Should I exercise when I don't feel well?" The provider plays an important role in providing accurate and sufficient information for clients to make informed decisions. Providers also teach clients to access and evaluate appropriate resources and to create plans that are easily accomplished, limited in scope, and easily evaluated for success. A technique that has proven successful is to ask clients how confident they are, on a scale of 1–10 (10 being maximally confident), that they will accomplish their objective. If the score is less than 7, encourage them to set a more realistic goal.

Contracting for health promoting behaviors is another useful strategy. A successful contract for behavior change is very specific. The contract may begin with the overall behavioral goal ("I wish to lose 20 pounds over the next year in order to improve my overall health, strength, and stamina."). The client determines his own short-term goal and means of achieving that goal for the next week ("I will exercise for 20 minutes, three times this week."). The nurse helps the client to pinpoint exactly how and when that will occur. The client is encouraged to write the exact time that the exercise will occur on his daytimer, and the exact form the exercise will take ("I will walk around my subdivision, which is $1^1/_4$ miles in length, at 10 a.m. on Tuesday, Thursday, and Saturday."). Ideally, the client and nurse will meet at the end of that time period to evaluate and modify the plan for the next week or so. Barriers to implementing the plan are reviewed and taken into consideration in order to rewrite the following week's contract. Self-management classes and contracting are strategies that can be incorporated, through individual sessions or in group meetings, to help implement the health promotion and disease prevention ideas discussed in this chapter.

Physical Activity

Functional decline in the elderly is attributable, at least in part, to physical inactivity. A significant number of deaths in the United States have been traced to insufficient activity and inadequate nutrition (McGinnis & Foege, 1993). Despite the well-documented benefits of exercise in reducing blood pressure and cholesterol, improving insulin resistance, reducing weight, strengthening bones, and reducing falls, two thirds of adults between 65 and 75 years of age are inactive. Thirty minutes of moderate activity, like brisk walking, can have dramatic, positive effects on health and well-being, but only 12% of Americans 75 years of age and older perform this level of activity.

Physical inactivity causes increased health care costs to our nation. In fact, a CDC study has shown that the direct medical costs of inactive Americans are markedly higher than costs for active Americans. The direct medical costs associated with physical inactivity were nearly $76.6 billion in 2000 (National Center for Chronic Disease Prevention and Health Promotion, 2004).

Scientific evidence supports the effectiveness of moderate physical activity in:

- Decreasing overall mortality
- Decreasing coronary heart disease, the leading cause of death in the United States
- Decreasing colon cancer
- Decreasing incidence and improving management of diabetes mellitus
- Decreasing incidence and improving management of hypertension

- Decreasing obesity
- Improving depression
- Improving quality of life
- Improving functional status
- Decreasing falls and injury

Moderate exercise is defined as 30 or more minutes of brisk walking on 5 or more days per week. Tai chi and yoga are helpful for improving balance and flexibility. Modified exercises, such as armchair exercises, can be helpful for the frail elderly or those with mobility restrictions. Sporadic, vigorous exercise should be discouraged.

Barriers to physical exercise that have been identified by the elderly include lack of access to safe areas to exercise, pain, fatigue, impairment in sensory function, and mobility. These barriers underscore the need to individualize your approach to helping clients develop an exercise regimen tailored to their unique needs and to participate in community efforts to create environments that foster healthy lifestyles. The Partnership for Prevention (2002) developed an excellent community assessment guide with a list of strategies for communities to overcome barriers to physical activities encountered by older adults. This guide, called "Creating Communities for Active Aging," is accessible on the Web at http://www.prevent.org/publications/Active_Aging.pdf.

What can be done to foster participation in physical exercise? Individuals can increase their chances of beginning, and sticking with, an exercise program if they identify activities that can be a regular part of their daily routine and identify individuals who can participate in the exercise with them. Nurses can help clients to assess their current level of activity and barriers that prevent them from exercising. The nurse can then help the client with goal setting, write a prescription for exercise, work with the client to develop an exercise program individually tailored to the client's unique needs, and follow up by telephone at regular intervals to assess progress and barriers. Follow-up phone calls can also be used to assess how well the client has done with accessing community resources.

Box 10-2 Physical Activity Counseling

Level I recommendation. The USPSTF found insufficient evidence to determine whether encouraging or counseling patients to begin an exercise program actually led to improvements in their level of physical activity. There is strong evidence to support the effectiveness of physical activity in reducing morbidity and mortality from chronic illness.

Nutrition

Four of the 10 leading causes of death in the United States (cancer, diabetes, coronary heart disease, and cerebral vascular accidents) are associated with unhealthy dietary patterns. More than 80% of Americans do not eat enough fruits or vegetables and eat too much fat. Elderly clients may be at increased risk for poor nutrition due to the fact that they have multiple chronic illnesses, may have tooth or mouth problems that may interfere with their ability to eat, may be socially isolated, may have economic hardship, may be taking multiple medications that can cause changes in appetite or gastrointestinal symptoms, and may need assistance

with self-care. Weight gain or loss may signal nutritional problems.

The USPSTF found good evidence that focused counseling interventions can produce significant changes among elderly clients who are at increased risk for diet-related chronic illness. This risk can be assessed with the following assessment tests:

- *DETERMINE Your Nutritional Health Checklist:* This tool was created by the Nutrition Screening Initiative, a collaborative project of health, medical, and aging organizations. The Nutrition Checklist can be ordered from their Web site for a nominal fee (http://www.aafp.org/x16087.xml).
- *Serum albumin:* <3.5 g/dl is associated with malnutrition and increased morbidity and mortality.
- *Body mass index (BMI):* The Nutrition Screening Initiative suggests that a BMI of 22–27 is to be considered normal. Values above or below this range suggest over- and underweight, respectively. Unintended weight loss is a nutritional risk that requires additional assessment. Obesity is a problem for many older Americans, just as it is for younger adults. The Obesity Education Initiative of the National Heart, Lung, and Blood Institute has provider guidelines and patient education materials (http://www.nhlbi.nih.gov/about/oei/index.htm).
- *Adult Treatment Panel (ATP III) Cholesterol Guidelines:* An unintended decrease in cholesterol to less than 150 mg/dl is a nutritional risk (http://www.nhlbi.nih.gov/guidelines/cholesterol/index.htm).
- *ADL and IADL measures:* These can assess a client's ability to eat and prepare food and to do the shopping and transportation necessary for good nutrition.
- *Dietary Reference Intakes and Recommended Daily Allowances:* These may be compared with food diaries from a 24- to 48-hour period to assess marked deviation from these guidelines. Clients who use many vitamin and nutritional supplements may be at risk for toxicities.
- *Depression and dementia:* These are risk factors for nutritional compromise.

The Nutrition Screening Initiative has booklets for clients and providers that are helpful in teaching about screening and treating nutritional problems related to chronic illnesses. The booklets may be accessed at http://www.aafp.org/PreBuilt/NSI_newbookletSMALLER.pdf.

General guidelines for dietary counseling include:

- Limit alcohol to one drink a day for women, two daily for men.
- Limit fat and cholesterol.
- Maintain balanced caloric intake.
- Ensure adequate daily calcium, especially for women.
- Older adults should consume vitamin B_{12} in crystalline form, which can be derived from fortified cereals and supplements
- Older adults who have minimal exposure to sunlight or who have dark skin need supplemental vitamin D. Daily vitamin D intake should be 400–600 IU and can be derived from fortified foods or supplements.
- Include adequate whole grains, fruits, and vegetables.
- Drink adequate water

Box 10-3 Nutrition Counseling

Level B recommendation. The USPSTF found good evidence to support counseling interventions among adults at risk for diet-related chronic disease. Interventions that have proven to stimulate healthy dietary changes combine nutrition education with behavioral counseling.

Tobacco Use

It is estimated that 4.5 million Americans aged 65 and older smoke cigarettes and that smoking accounts for one out of every five U.S. deaths. Elderly Americans are just as likely to benefit from quitting smoking as are younger adults. Quitting smoking can decrease the chance of having a myocardial infarction or dying from lung cancer or heart disease. Nonsmokers have improved wound healing, recovery from illness, and cerebral circulation.

A practice guideline to guide clinicians to help their patients quit smoking has been developed through the Public Health Service and is available online at http://www.ahrq.gov/clinic/tobacco/whatisphs.htm. The task force stresses that the most important step in helping a client to quit smoking is to screen for tobacco use and assess the client's willingness to quit. They outline two different interventions, the 5 As, for clients who are ready to quit smoking, and the 5 Rs, for those who need additional motivation before they are ready to quit.

The 5 As

Ask about smoking status at each health care visit.

Advise client to quit smoking.

Assess client's willingness to quit smoking at this time.

Assist client to quit using counseling and pharmacotherapy.

Arrange for follow-up within one week of scheduled quit date.

The 5 Rs

Relevance means asking the client to think about why quitting may be personally relevant for him.

Risks of smoking are identified by the client.

Rewards of quitting are identified by the client.

Roadblocks or barriers to quitting are identified by the client.

Repetition of this process at every clinic visit. Most people who successfully quit smoking require multiple attempts.

Safety

Many of the safety recommendations for older adults are similar to those for younger people:

Box 10-4 Tobacco Cessation Counseling

Level A recommendation. The USPSTF found good evidence that screening, brief behavioral counseling, and pharmacotherapy are effective in helping clients to quit smoking and remain smoke-free after one year. There is good data to support that smoking cessation lowers the risk for heart disease, stroke, and lung disease.

using lap and shoulder belts in motor vehicles, avoiding driving while intoxicated, using smoke detectors in the home, and maintaining hot water heaters at or below 120°F. Falls, however, are a safety risk that is relatively unique to the elderly.

Falls are the leading cause of unintentional injury death in older adults in this country. Approximately one half of elderly adults living in institutions and one third of community-dwelling elders fall every year (Roman, 2004). Between 5% and 11% of these falls result in serious injuries, including fractures. Twelve thousand Americans die as a result of a fall each year. Elderly adults are susceptible to falls as a result of postural instability, decreased muscle strength, gait disturbances and decreased proprioception, visual and/or cognitive impairment, and polypharmacy. Environmental conditions that contribute to falls are slippery surfaces, stairs, irregular surfaces, poor lighting, incorrect footwear, and obstacles in the pathway.

Patients who fall more than twice in a 6-month period require fall risk assessment and intervention. An easy-to-administer fall risk assessment tool is one that uses the mnemonic "I HATE FALLING." It is described in **Box 10-5**.

Balance and strengthening exercises, home safety modifications, and elimination of high-risk medications have been the focus of fall-risk prevention strategies. There are strong data to support the effectiveness of balance and strengthening exercises on fall reduction and research to support physiologic and environmental risk factor reduction, as well. The intensity of intervention required to make a difference, however, is not clear at this point. We do not know whether discussing the need to exercise and some home safety and medication recommendations in a brief office visit will be effective in reducing falls, or if a more intensive intervention is necessary. There is evidence to support the latter, intensive approach in community-dwelling elders aged 75 or older or in clients 70–74 years of age who use antihypertensive or psychoactive medications, who use four or more prescription medications, or who have cognitive impairment or impairment of gait, strength, or balance (USPSTF, 2004).

Box 10-5 I Hate Falling

Inflammation of joints or joint deformity
Hypotension (orthostatic blood pressure change)
Auditory and visual abnormalities
Tremor
Equilibrium problems
Foot problems
Arrythmias, heart block, valvular disease
Leg-length discrepancy
Lack of conditioning (generalized weakness)
Illness
Nutrition (poor, weight loss)
Gait disturbance

Source: Adapted with permission from Sloan, J. P. (Ed.). (1997). Mobility failure. *Protocols in primary care geriatrics* (pp. 33–38). New York: Springer.

Polypharmacy and Medication Errors

Elderly adults are at increased risk of adverse drug effects compared to younger adults, because they take more medications, as well as due to the biologic effects of aging and chronic diseases. Medication under- and overutilization by this population has been shown to increase

the number of hospitalizations and emergency room visits, to worsen cognitive functioning, and to contribute to falls.

AHRQ has appointed a Task Force on Aging to investigate important health issues related to the elderly population. This task force has set enhanced patient safety through reduction of medication errors in the elderly population as one of its priorities for clinical practice improvement. The United States Pharmacopeia (USP) has created a Personal Medication Organizer to help seniors play an active role in keeping track of their own medications. The organizer is available at www.usp.org/pdf/EN/patientSafety/personalMedOrg.pdf.

Adults over 65 years of age take an average of 4.5 prescription and 2 over-the-counter medications at any one time. This number is markedly higher for hospitalized patients or those living in nursing homes or assisted living facilities. Polypharmacy is not always inappropriate in this population of clients who have multiple chronic illnesses, but increased numbers of medications carry increased risks. Frail elderly adults are more likely than healthier age-mates to suffer adverse drug reactions.

It is estimated that one fifth of community-dwelling elderly clients are prescribed medications that are not recommended for use in this population. These medications include long-acting benzodiazepines, sedative or hypnotic agents, long-acting oral hypoglycemics, analgesics, antiemetics, and gastrointestinal antispasmodics. Elderly clients who require home care services and are, therefore, among the more disabled, are prescribed these medications even more often than the healthier members of their cohort. The Beer's List of medications to be avoided in the elderly has become a national guideline for prescribers and pharmacists in the United States (Fick, Cooper, Wade, Waller, Maclean, & Beers, 2003).

Box 10-6 Fall Prevention Counseling

Level B recommendation. Balance and strengthening exercise programs, home safety assessment and training, and medication monitoring and adjustment are recommended in order to reduce fall risk.

Immunizations

Annual vaccination against influenza is recommended for all adults 65 years of age and older because more than 90% of the deaths from influenza occur in this population. Several studies suggest that flu vaccination is beneficial in preventing illness, hospitalization, and mortality in both community-dwelling and institutionalized elderly individuals. For elderly clients residing in assisted living facilities or in nursing homes, during institutional outbreaks, amantadine or rimantadine should be given at the same time as the vaccination and continued for 2 weeks in order to provide protection until immunity from vaccination develops.

Older adults, especially those with chronic illnesses or who live in nursing homes, are susceptible to pneumococcal pneumonia, which results in death in over one third of clients over 65 years of age who acquire the disease. The emergence of drug-resistant strains of pneumococcal disease underscores the importance of

Box 10-7

Influenza vaccination annually Level B recommendation

Amantadine or Rimantadine prophylaxis: Level B recommendation

Box 10-8
Pneumococcal vaccination:
Level B recommendation

Box 10-9
Tetanus vaccination:
Level A recommendation

acquired immunization against the illness. Pneumococcal vaccine is given once for clients who are 65 years of age or older. There is evidence to support one-time-only revaccination for clients 75 years and older who have not been vaccinated in 5 or more years.

Tetanus and diphtheria are uncommon diseases in the United States, but only 28% of adults age 70 and older are immune to tetanus. It is these adults who account for the majority of tetanus, a disease that results in death in more than one quarter of cases. The tetanus and diphtheria (Td) vaccine is highly efficacious against tetanus, but immunity may wane after 10 years. Periodic boosters of tetanus vaccine, traditionally given every 10 years in the United States, are recommended for older adults by the USPSTF.

Mental Health Screening

Mental health enables individuals to participate in productive activities and relationships and to adjust to change and loss. Mental disorders are characterized by alterations in mood, behaviors, or cognition and are associated with impaired functioning and/or distress. Mental disorders have been associated with complications resulting in disability or death and profoundly affect family members as well as patients. Mental disorders are as common in late life as they are during other stages of the lifespan, but some disorders are relatively unique to elderly clients.

Depression

Although estimates of depression vary widely, up to 37% of community-dwelling older adults are depressed. Depression rates increase markedly among clients who have chronic illness or disability and have been found to be 12% for hospitalized geriatric clients and up to 25% for nursing home residents. Elderly men have the highest rates of suicide in the nation.

There is good evidence to support screening for depression in adults, including older adults. Screening can improve identification of depressed elders and improve outcomes. Screening efforts must be coordinated with effective treatment and follow-up in order to have maximal benefit. Initial screening may be accomplished by asking two questions about mood and anhedonia: "Over the past 2 weeks, have you felt down, depressed, or hopeless?" and "Over the past 2 weeks, have you felt little interest or pleasure in doing things?" A positive response to this initial screen may be followed with the Geriatric Depression Scale (see **Figure 10-1**), which has been found to have a 89%–92% sensitivity for detecting depression in elderly adults (Kurlowicz, 1999). A positive depression screen should be followed with an assessment of suicide risk and substance abuse.

Box 10-10 Depression

Level B recommendation to support screening. The USPSTF found good evidence that screening effectively identifies depressed patients and that treatment of depression improves clinical outcomes.

Figure 10-1 Geriatric Depression Scale (GDS), short form.

Choose the best answer for how you have felt over the past week:

1. Are you basically satisfied with your life? Yes / **NO**
2. Have you dropped many of your activities and interests? **YES** / No
3. Do you feel that your life is empty? **YES** / No
4. Do you often get bored? **YES** / No
5. Are you in good spirits most of the time? Yes / **NO**
6. Are you afraid that something bad is going to happen to you? **YES** / No
7. Do you feel happy most of the time? Yes / **NO**
8. Do you often feel helpless? **YES** / No
9. Do you prefer to stay at home, rather than going out and doing new things? **YES** / No
10. Do you feel you have more problems with memory than most? **YES** / No
11. Do you think it is wonderful to be alive now? Yes / **NO**
12. Do you feel pretty worthless the way you are now? **YES** / No
13. Do you feel full of energy? Yes / **NO**
14. Do you feel that your situation is hopeless? **YES** / No
15. Do you think that most people are better off than you are? **YES** / No

Scoring: One point for each of these answers. Normal, 0–5; Suggests depression, above 5. For additional information on administration and scoring, refer to the following reference:

Sheikh JL, & Yesavage JA. Geriatric Depression Scale: Recent evidence and development of a shorter version. *Clinical Gerontologist,* 1986, (5), 165–172. (Reprinted with permission from Hawthorn Press, Inc.)

Dementia

Dementia affects almost half of elderly Americans 85 years of age and older. Alzheimer's disease (AD) accounts for 60%–70% of all cases of dementia and is associated with doubling of the death rate, compared to clients who are free from AD, and markedly increased rates of nursing home admissions. AD prevalence rates double every 5 years after the age of 65. Multi-infarct dementia accounts for 20%–30% of dementias and is the second leading cause of dementia in

the United States. Dementia is a chronic and progressive illness characterized by behavioral and cognitive changes that affect memory, problem solving, judgment, and speech, and that cause deficits in functional abilities.

Unfortunately, there is insufficient evidence at this time to suggest that population-wide screening of Americans 65 years and older for dementia is beneficial. We do know that it is difficult to recognize early AD and, in fact, one study demonstrated that primary care physicians failed to detect AD 24% to 72% of the time. Failure to diagnose early AD may severely compromise client safety as a result of household accidents and motor vehicle accidents. These clients are susceptible to financial losses through errors and scams that prey on the elderly. There is sufficient evidence to support the fact that medication delays the rate of cognitive impairment associated with AD, which can lead to improved quality of life for individuals and families, and decreased costs of care for our nation. Experts do recommend thorough screening for clients in whom cognitive impairment is suspected or when concerns are expressed by family members or friends.

Three screening tests are commonly used for all forms of dementia. The Mini Mental State Examination (MMSE) is considered the "gold standard" diagnostic test to detect dementia. It has reasonable sensitivity and specificity, and can be made more sensitive or specific depending on the cutpoint used to diagnose dementia (Folstein, Folstein, McHugh, 1975). The clock-drawing test, in which a client is asked to draw a clock face and indicate a particular time, is a sensitive but nonspecific screening test (Sunderland et al., 1989). The use of informant reporting of an individual's cognitive status has been found to be a useful screening tool as well.

Box 10-11 Dementia Screening

Level I recommendation. The USPSTF found the clinical evidence to be insufficient to recommend screening for all elderly clients in a primary care setting. Most expert panels agree that clients who are suspected of having cognitive impairment or whose families express concern about their cognitive functioning should be screened.

It is important to distinguish between screening tools and tests used for the differential diagnosis of dementia. A thorough dementia evaluation involves a complete history and examination, laboratory testing, and brain imaging.

Alcohol Abuse

The prevalence of alcohol abuse by community-dwelling elderly in the United States is largely unknown, but 6% to 11% of elderly adults admitted to hospitals are found to have problems with alcohol (National Institute of Alcohol Abuse and Alcoholism, 1998). It is very difficult to diagnose alcohol problems in the elderly for several reasons. Retired people do not have the lifestyle disruptions caused by heavy alcohol use that are commonly encountered in younger adults. They are less likely to be arrested due to disorderly conduct or aggression related to their drinking. Alcoholics over the age of 65 are more likely to be living alone and drinking alone than younger adults. On the other hand, the older drinker is more likely to honestly report his or her drinking to the health care provider and more likely to comply with treatment strategies. Elderly clients have alcohol-related complications

that are not generally seen in younger adults, such as increased rates of hip fractures due to falls and medication reactions due to alcohol's effects on liver enzyme systems.

There is some evidence to suggest that light to moderate alcohol consumption in older adults may reduce the risk of coronary heart disease. The National Institute on Alcohol Abuse and Alcoholism (NIAAA) recommends no more than one drink per day for this purpose.

More than 7 drinks per week for women, or 14 drinks per week for men, is the quantity of alcohol that has been defined as "risky" or "hazardous."

Several screening tools are commonly used to screen for alcohol abuse. The CAGE questionnaire is a self-report screening instrument that is easy and quick to administer (Ewing, 1984). It asks four yes/no questions and requires approximately 1 minute to complete. CAGE is a mnemonic for the four key screening questions:

- **Cut Down** question relates to attempts by the client to cut down on drinking.
- **Annoyance** is related to suggestions by friends or family to cut down on drinking.
- **Guilt** about drinking.
- **Eye opener** relates to a question about the need for a drink in the morning to get going.

The CAGE questionnaire has been found to have a 75% sensitivity and a 96% specificity. The 5 As and 5 Rs strategies defined under the section on tobacco abuse in this chapter are also suggested strategies for reducing alcohol consumption.

The Alcohol Use Disorders Identification Test (AUDIT) is a 10-item screening test developed by the World Health Organization and is sensitive for detecting alcohol dependence and abuse. You can learn more about this screening tool at http://whqlibdoc.who.int/hq/2001/WHO_MSD_MSB_01.6a.pdf.

Box 10-12 Alcohol Screening

Level B recommendation for screening. The USPSTF found good evidence that screening is beneficial in identifying patients whose alcohol consumption patterns place them at risk for increased morbidity and mortality, as well as good evidence that counseling about alcohol reduction can produce a sustained benefit over a 6- to 12-month period.

Elder Abuse and Neglect

Unfortunately, it is difficult to estimate the prevalence of elder abuse and neglect in this country due, at least in part, to the lack of appropriate screening instruments and consequent underreporting of abuse and neglect by health care professionals. Reporting of elder abuse to the **adult protective service agency** is mandatory in almost all states, but it is estimated that only 1 in 10 cases of elder abuse and neglect is actually reported. There is a paucity of studies to determine the effectiveness of interventions in decreasing abuse. Studies directed toward identification of both abuse victims and perpetrators are needed.

Elder abuse may include physical, sexual, psychological, and financial exploitation; neglect; and violation of rights. Physical abuse includes shaking, restraining, hitting, or threatening with objects. Sexual abuse includes unwanted contact with the genitals, anus, or mouth. Clients who are psychologically abused experience threats, insults, or harassment, or are recipients of harsh commands. Financial abuse occurs in the form of scams, or by family members who try to misuse a client's money or pos-

sessions. Neglect may be intentional or unintentional and occurs when required food, medication, or personal care is not provided. Abandonment is a form of neglect whereby someone who has agreed to provide care for an elderly client deserts that client. Clients who are denied the right to make their own decisions, even though they are competent to do so, or who are not provided privacy or the right to worship are suffering from a violation of their inalienable rights.

Most cases of elder abuse are perpetrated by a family member, and reasons for the abuse include caregiver burnout and stress, financial worries, transgenerational violence, and psychopathology in the abuser. Women and dependent elders tend to be the most vulnerable to abuse.

Assessment of abuse can be very difficult because the victim may be cognitively impaired and unable to describe the abuse. It is not unusual for elderly clients to have multiple bruises due to poor balance and loss of subcutaneous fat. Clues to abuse may include:

- The presence of several injuries in different stages of repair
- Delays in seeking treatment
- Injuries that cannot be explained or that are inconsistent with the client's history
- Contradictory explanations by the caregiver and the patient
- Bruises, burns, welts, lacerations, or restraint marks
- Dehydration, malnutrition, decubitus ulcers, or poor hygiene
- Depression, withdrawal, or agitation
- Signs of medication misuse
- Pattern of missed or cancelled appointments
- Frequent changes in health care providers
- Discharge, bleeding, or pain in rectum or vagina or sexually transmitted disease
- Missing prosthetic device(s), such as dentures, glasses, or hearing aids

The USPSTF decided that there is insufficient evidence to support mass screening of asymptomatic elderly clients for abuse, or for the potential for abuse. Suspected abuse should be evaluated through a thorough history with patients, caregivers, and other significant informants, taken separately. Home visits can yield important clues to the situation. Physical examination, including mental status and evaluation of mood, is critical. Laboratory and imaging studies can support suspicions of dehydration, malnutrition, medication abuse, and fractures or other injuries.

If suspicions are strengthened through this assessment, a collaborative approach to management and prevention is required. Team members include the adult protective service agency, social workers, psychiatrists, lawyers, and law enforcement officials. It is important to ascertain whether the client is in immediate danger, in which case law enforcement will be helpful in removing the client from the dangerous situation. The approach to any abuse case should be coordinated with the adult protective service agency, as mandated by law. You should report

Box 10-13
Elder Abuse Screening

Level I evidence. Insufficient evidence to support mass screening based on insufficient research to support the use of any particular screening tool, and lack of evidence to support that identification of risk changes outcomes.

abuse and neglect within 48 hours of the time that you become aware of the situation. Elder abuse that occurs in nursing homes and assisted living facilities must be reported to the long-term care ombudsman program in most states.

In summary, guidelines for elder abuse treatment recommend that you 1) report abuse and neglect to the adult protective service or other state-mandated agencies; 2) ensure that there is a safety plan and assess safety; 3) assess the client's cognitive, emotional, functional, and health status; and 4) assess the frequency, severity, and intent of abuse. It is important that the nurse's involvement does not end with the referral, but includes an ongoing plan of care because elderly persons referred to adult protective services are at increased risk of mortality in the decade following the referral.

Physical Health Screening

Heart and Vascular Disease

Coronary heart disease (CHD) is the leading cause of death in the United States. Every year over 1 million Americans have a new or recurrent myocardial infarction (MI) or die from coronary heart disease. Over 25% of patients who suffer MI or sudden death have no prior warning symptoms (Greenland, Smith, & Grundy, 2001). Most of these unexpected cardiac events and cases of sudden death occur in patients over 65 years of age. For this reason, identification of clients at risk for MI who may be able to benefit from primary prevention strategies is desirable. National Health and Nutrition Examination Survey (NHANES) III data (2004) suggest that approximately 25% of U.S. adults may be at high risk for coronary event and potential beneficiaries of primary prevention strategies.

The **Framingham Heart Study** has elucidated many of the risk factors associated with coronary heart disease. This study began about 50 years ago with over 5,000 male and female subjects, in order to study cardiovascular risk factors. As a result of decades of epidemiologic work, the following risk factors have been identified:

- Age ≥50 for men and 60 for women
- Hypertension
- Smoking
- Obesity
- Family history of premature CHD
- Diabetes (considered to be a CHD risk equivalent [i.e., carries the same risk of coronary event as known CHD])
- Sedentary lifestyle
- Abnormal lipid levels (Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults, 2001)

Several emerging risk factors, including homocysteine, lipoprotein a (Lp(a)), and infectious agents, are currently under investigation. A risk assessment tool developed as a result of discoveries from the Framingham Study may be accessed at http://hin.nhlbi.nih.gov/atpiii/calculator.asp?usertype=prof. The risk factors included in the Framingham calculation of 10-year risk are age, total cholesterol, HDL cholesterol, systolic blood pressure, treatment for hypertension, and cigarette smoking. Patients who have diabetes or atherosclerotic diseases are known to have a >20% chance of a cardiac event in the next 10 years; the tool is not necessary to calculate risk for these patients.

In order to utilize this risk assessment tool, screening for the cardiac risk factors included in the tool must be performed. We will examine these screening guidelines, and the evidence to support these screenings, individually.

Lipids

There is strong evidence to link elevations in total cholesterol (TC), low density lipoprotein (LDL-C), and low levels of high density lipoprotein (HDL-C) with coronary risk. Four large primary prevention trials documented a 30% reduction in cardiac events for clients whose cholesterol was reduced using statin therapy. Unfortunately, there were very few subjects older than 65 years of age in these trials, but the USPSTF has determined that the results are generalizable to the elderly population. There is no age at which the task force recommends screening be stopped, but cholesterol levels are unlikely to increase after age 65. For patients who have been tested and found to have normal levels of cholesterol before the age of 65, testing may not be necessary in later years.

The ratios of TC to HDL-C or LDL-C to HDL-C are better predictors of risk than TC alone. It is possible to accurately measure TC and HDL-C on nonfasting venous or capillary blood samples, but fasting blood samples are required for accurate LDL-C measurement. Two separate measurements are required for definitive diagnosis. The optimal interval for lipid testing has not been determined, but most expert guidelines support testing every 5 years, with shorter intervals for people who have elevated lipid levels and may require therapy.

Box 10-14 Lipid Screening

Level A recommendation for screening. There is strong evidence to correlate lipid abnormalities with cardiac risk. A simple blood test is a valid and reliable method of diagnosing lipid abnormalities, and diet and drug therapies are effective remedies.

Hypertension

Fifty million Americans have high blood pressure. Older Americans have the highest prevalence of hypertension and are the least effectively treated. Framingham data suggest that clients who have normal blood pressures at age 55 have a 90% chance of developing hypertension at some time in their lives. Systolic blood pressure, which is more strongly correlated with CVAs, renal failure, and heart failure than diastolic blood pressure, is the most common form of hypertension in the elderly and less likely to be well controlled than diastolic blood pressure. The NHANES study found that among subjects 60 years of age and older, isolated systolic hypertension (systolic $\geq$140 with diastolic $<$90 mm Hg) was present in 65% of cases of high blood pressure.

It is important to diagnose and treat hypertension to reduce the incidence of cardiac disease. The correlation of cardiovascular risk and blood pressure is dramatic: Risk doubles with each increment of 20/10 mm Hg after 115/75. Treatment of isolated systolic hypertension in the elderly reduced stroke and coronary heart disease events by 30%, heart failure by 50%, and total mortality by 13%. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7) (2003) is a national guideline for blood pressure screening

and treatment and can be accessed at http://www.nhlbi.nih.gov/guidelines/hypertension/.

Blood pressure readings may be accurately determined by a properly calibrated sphygmomanometer using an appropriately sized cuff (the cuff's bladder needs to encircle at least 80% of the client's arm). Clients should have been seated in a chair for at least 5 minutes before blood pressure is measured. The client's feet should be uncrossed on the floor and the arm at heart level. Blood pressure measurements should be validated by measuring pressure in the contralateral arm. It is recommended that hypertension be diagnosed only after two or more elevated readings are obtained on at least two visits over a period of one to several weeks.

Lifestyle modifications are effective in preventing hypertension and lowering blood pressure in clients who have hypertension. These lifestyle changes include physical activity, weight loss, reducing dietary sodium, and the **Dietary Approaches to Stop Hypertension (DASH) diet**, published by the National Institutes of Health (NIH) and downloadable from the web at http://www.nhlbi.nih.gov/health/public/heart/hbp/dash/new_dash.pdf. This is a comprehensive plan that can be given to patients and includes a summary of the JNC 7 guidelines on hypertension, the results of studies on the DASH eating plan and its effectiveness in lowering hypertension, a diet journal, a tutorial on reading and understanding food labels, and meal plans using the DASH diet.

Box 10-15 Blood Pressure Screening

Level A recommendation. There is strong evidence that blood pressure measurement can identify adults at increased risk for cardiovascular disease due to high blood pressure. Treatment of hypertension substantially decreases the incidence of cardiovascular disease.

Aspirin Therapy

Aspirin therapy has long been known to be effective as a secondary prevention strategy for clients with heart disease, but the risks of gastrointestinal bleeding and hemorrhagic stroke associated with aspirin therapy have delayed recommendations of aspirin as a means of primary prevention. A meta-analysis of five primary prevention trials that showed a 28% reduction of cardiac disease in subjects (most of whom were older than 50) has led experts to recommend "discussion" about aspirin chemoprophylaxis with clients at high risk for developing CHD. Gastrointestinal bleeding occurred in about 0.3% of subjects given aspirin for 5 years, causing some concerns about the risk versus benefit of aspirin for primary prevention of heart disease in patients who are at low risk for cardiac illness.

Box 10-16 Aspirin Therapy

Level A recommendation. There is good evidence that aspirin decreases the incidence of CHD in adults who are at increased risk for heart disease, but aspirin increases the incidence of gastrointestinal bleeding and hemorrhagic strokes. The USPSTF concluded that evidence is strongest to support aspirin therapy in patients at high risk of CHD.

Cerebrovascular Disease

Cerebrovascular accidents (CVAs) are the third leading cause of death in the United States; 87% of these deaths and 74% of all hospitalizations resulting from CVAs occur in persons age 65 years or older. The physical, psychological, economic, and social costs of CVAs are enormously high, to clients as well as their families. Strokes are a significant cause of dependency among the elderly. The primary risk factors for ischemic stroke are similar to those described in the last section on heart disease: increased age, hypertension, smoking, and diabetes. Clients with coronary artery disease are at increased risk for stroke, because atherosclerotic vessel disease is a common etiology for the two diseases. Lifestyle factors associated with CVA risk that have been identified by the National Stroke Association are heavy alcohol use, cigarette smoking, sedentary lifestyle, and a high-fat diet. In addition to these risk factors, atrial fibrillation and asymptomatic carotid stenosis place clients at high risk for cerebrovascular disease.

It is estimated that 36% of strokes suffered by clients 80–89 years of age are as a result of nonvalvular atrial fibrillation (National Stroke Association, 1999). Adequate anticoagulation with warfarin therapy in patients with atrial fibrillation has been found to reduce stroke occurrence by 68%. Aspirin therapy was found to reduce CVAs by only 21%. It is based on these data that National Stroke Association guidelines recommend the use of oral anticoagulation with warfarin for patients older than 75 years of age with nonvalvular atrial fibrillation. Patients 65 to 75 years old with atrial fibrillation as well as other CVA risks should be treated with warfarin, and those without additional risk factors may be treated with warfarin or aspirin. The consensus panel of the Stroke Association underscores the importance of weighing the risk of hemorrhage against the benefit of therapy on an individual patient basis.

Carotid stenosis is an important stroke risk factor; however, there is insufficient evidence to recommend screening asymptomatic persons for carotid artery stenosis, using either physical examination or carotid ultrasound. Screening is justified if early treatment can change clinical outcomes and if we have effective, low-risk screening tests. The inability of experts to recommend screening is based on the fact that there is significant debate about the risks and benefits of carotid endarterectomy as a treatment for asymptomatic disease. The American Heart Association (1998) recommends carotid endarterectomy for asymptomatic stenosis when the artery is at least 60% occluded, but the USPSTF does not recommend carotid ultrasound for asymptomatic patients based on remaining questions about the risks and benefits of carotid endarterectomy as a result of varying surgical risks among studies. Physical findings that suggest stenosis, by auscultation of the carotid artery, are a poor predictor of subsequent stroke.

Experts agree that the risk of a stroke can be minimized through treatment of hypertension; using statin therapy after MI for normal and high cholesterol; using warfarin for patients with atrial fibrillation and specific risk factors, and for patients after MI who have atrial fibrillation, left ventricular thrombus, or decreased left ventricular ejection fraction; and modification of lifestyle-related risk factors like smoking, alcohol use, physical activity, and diet.

Thyroid Disease

The USPSTF has found insufficient evidence to support screening for thyroid disease in adults.

Older adults are far more susceptible to thyroid dysfunction than younger adults. Overt disease affects 5% of American adults, but the prevalence of subclinical hypothyroidism (elevated TSH with normal levels of thyroid hormone) is 17.4% among women older than age 75 and 6.2% among men over age 65. Approximately 2%–5% of these cases of subclinical hypothyroidism will progress to overt hypothyroidism each year. The American Association of Clinical Endocrinologists (AACE) has published clinical guidelines for the diagnosis and management of thyroid disease (AACE Task Force, 2002), in which it states that subclinical hypothyroidism may be associated with gastrointestinal disorders, depression, dementia, lipid disorders, increased likelihood of goiter, and overt thyroid disease.

Subclinical hyperthyroidism is far less common in the population, affecting only a little more than 1% of adults over 60 years of age, but is present in up to 20% of patients taking levothyroxine for hypothyroidism.

Untreated hyperthyroidism can lead to atrial fibrillation, congestive heart failure, osteoporosis, and neuropsychiatric disorders. Hypothyroidism can cause constipation and ileus, lipid abnormalities, weight gain, decreased cognition, depression, and negative changes in functional status. The goal of screening would be to decrease the negative effects of overt thyroid disease.

The task force's inability to recommend for or against screening of asymptomatic persons for thyroid disease results from the lack of clarity about the risks of subclinical disease. It is clear that both hypothyroidism and hyperthyroidism cause significant morbidity and need to be treated, but the negative consequences of these diseases appear to be present primarily in patients who present with symptoms of the disease. There are significant costs and risks associated with thyroid replacement, which need to be considered before recommending mass screening. Many patients who receive thyroid hormone replacement develop subclinical hyperthyroidism, which may increase the risk of developing osteoporosis, hip fracture, and atrial fibrillation. The task force recommends that clinicians be cognizant of the signs and symptoms of thyroid disease, and test symptomatic patients. Evidence is lacking to justify screening of asymptomatic patients, however. The AACE supports treatment of subclinical hypothyroidism if thyroid antibodies are positive. Thyroid antibodies are elevated in Hashimoto's thyroiditis, the most common cause of subclinical hypothyroidism. Clients with goiters and positive antibodies are more likely than other patients to progress to overt hypothyroidism.

Box 10-17
Thyroid Disease Screening

Level I recommendation. There is insufficient evidence to recommend for or against screening based on limited evidence to establish health risks of subclinical disease and due to the risks of treatment.

Osteoporosis

One half of all postmenopausal women will have a fracture related to osteoporosis at some point in their lives. The risk for the development of osteoporosis markedly increases with age; osteoporosis is responsible for 70% of the fractures that occur in older adults. Women aged 65–69 have six times the risk of osteoporosis than younger postmenopausal women, and that rate

increases to 14 times in women aged 75–79. Age, low body mass index (BMI), and failure to use estrogen replacement are the strongest risk factors for osteoporosis development. Other possible risks include Caucasian or Asian race, family history of compression or stress fracture, fall risk or history of fracture, low levels of weight-bearing exercise, smoking, excessive alcohol or caffeine use, and low intake of calcium or vitamin D. Certain medications, such as thyroid medication or prednisone, also increase the chances of developing osteoporosis.

Some men are at increased risk for osteoporosis, and decisions about screening may be made on an individual basis. Men with chronic lung disease, low testosterone levels, and who require steroid medications for extended periods of time are at increased risk of bone loss.

There is a strong association between bone mass and fracture risk, which continues into old age. Multiple studies demonstrate that therapies that slow bone loss are effective in reducing fracture risk, even if they are begun in old age.

The risk associated with age alone was high enough that the USPSTF recommends routine screening for all women over the age of 65. If risk factors, especially weight less than 70 kg and no estrogen therapy, are present, the task force suggests screening women at age 60. Bone density testing at the femoral neck by dual energy x-ray bone densitometry is the gold standard screening tool, and the one that is most closely correlated with hip fracture risk, though heel measurements, using ultrasonography, are also predictive of short-term fracture risk.

Men are at significantly less risk for osteoporosis development than are women, and there are no recommendations for male screening.

Box 10-18
Osteoporosis Screening

Level B recommendation. Osteoporosis is common in the elderly and is correlated with fracture risk. There are good screening tests to diagnose osteoporosis and effective treatments for the disease.

Vision and Hearing

The prevalence of hearing and visual impairment increases with age and has been correlated with social and emotional isolation, clinical depression, and functional impairment. An objective hearing loss can be identified in over one third of persons ages 65 years and older and in up to half of patients ages 85 years and older. High-frequency loss is the most important contributor to this increase in hearing loss, though up to 30% of cases may be caused or compounded by cerumen impaction or otitis media, which are easily treated.

About 4% of adults ages 65–74, and 16% of those 80-84 years of age have bilateral visual acuity worse than 20/40. Macular degeneration is the most common cause of vision loss in elderly Caucasians, whereas African Americans are more likely to lose vision as a result of cataracts, glaucoma, and diabetes. Visual impairment has been correlated with falls and hip fractures in the elderly (Ivers, Cumming, Mitchell, Simpson, & Peduto, 2003).

The Snellen Eye Chart is a useful tool for vision screening. Ophthalmology referral may be useful for clients whose corrected vision is worse than 20/40, or who report visual problems that limit activities such as reading or driving. Many expert panels, including the American Academy of Ophthalmology, the American Optometric Association, and Prevent Blindness

Box 10-19 Hearing Screening

Level B recommendation. The task force recommends screening older adults for hearing loss by asking them about their hearing, counseling them about hearing aids, and referring them to specialists when abnormalities are detected.

America recommend regular ophthalmologic exams for adults over 65 years of age (40 years of age for African Americans) based on the fact that effective glaucoma screening should be performed by eye specialists with specialized equipment to evaluate the optic disc and measure visual fields. The optimal frequency for glaucoma screening has not yet been determined.

Screening older adults for hearing impairment is recommended. Nurses should ask questions about hearing changes and make clients aware of potential treatments and devices if needed. Pure-tone audiometry has a sensitivity of 92% and a specificity of 94% for detecting sensorineural hearing loss. One randomized controlled trial demonstrated a measurable improvement in social, cognitive, emotional, and communication function in a group of elderly veterans with hearing loss when they were fitted for and used hearing aids (Mulrow et al., 1990). It can sometimes be difficult for elderly individuals to adjust to the use of hearing aids, but compliance rates of close to 40%–60% have been documented. Hearing aids can improve communication, social function, and emotional well-being.

Prostate Cancer

Prostate cancer is both the second most common form of cancer among U.S. men and the second leading cause of cancer death in U.S. men. The risk of developing prostate cancer increases with age; in fact, more than 75% of cases are diagnosed in men aged 65 and older, and this group accounts for 90% of deaths due to prostate cancer. The disease is most prevalent in African Americans and least prevalent among Asian Americans.

Two tests are commonly used in prostate cancer screening: the digital rectal exam (DRE) and the prostate-specific antigen (PSA) blood test. DRE has a sensitivity of less than 60% and very poor inter-rater reliability. Sensitivity is improved by combining the PSA and DRE, but specificity, the risk of false-positive testing, suffers as a result of combined testing. Benign prostatic hypertrophy is common in older men, and the presence of this disease increases the likelihood of false positive testing with the PSA.

Approximately 25% of prostate cancers are slow-growing and unlikely to be a cause of significant morbidity and mortality in older men. The greatest controversy regarding screening for prostate cancer is the inability to accurately predict which cancers will be aggressive and require treatment, and which are unlikely to metastasize.

Box 10-20 Prostate Cancer Screening

Level I recommendation. There is insufficient evidence to recommend screening based on inconclusive evidence that screening with DRE and PSA improves health outcomes. Men with a life expectancy of less than 10 years are unlikely to benefit from prostate screening.

Seventy percent of cancers detected by PSA and DRE screening are confined to the prostate. There are two methods to treat these organ-confined cancers: radiation and prostatectomy. There are no large randomized controlled trials that demonstrate the effectiveness of either of these methods compared to "watchful waiting" in treating screening-identified, organ-confined prostate cancer. A large clinical trial sponsored by the National Cancer Institute is currently underway. The Prostate, Lung, Colon and Ovarian (PLCO) Cancer Screening trial is designed to determine whether prostate screening and early detection of prostate cancer improve patient outcomes (National Cancer Institute, 2001). The PLCO study's preliminary findings suggest that the frequency of screening may need to be less often than commonly performed. Five-year intervals between PSA/ DRE screenings may be sufficient for most men with low levels of PSA.

Breast Cancer

Breast cancer is the most common cancer among U.S. women, and the prevalence of the disease increases with age. Half of all cases of breast cancer occur in women over 65 and 13% of women over 65 years of age will be diagnosed with breast cancer. Other risk factors for the disease include family history of breast cancer, atypical hyperplasia in breast tissue, and birth of a first child when a woman is over 30 years of age. The USPSTF examined whether breast cancer screening by mammography was beneficial in older women. Although disease prevalence is high in this population, the task force wondered whether early detection of disease would improve health outcomes in a population that also has a higher incidence of other chronic illnesses. They wondered if there was an upper age limit at which breast cancer screening would no longer be beneficial. There have been no studies that analyzed screening for women over 74 years of age, but the task force concluded that, unless a woman has significant comorbidity that will significantly limit her life expectancy, screening is warranted based on the high mortality from the disease in older women.

Screening tests used to detect breast cancer include mammography, clinical breast exam by a health care provider, and self breast exam. The sensitivity of mammography to detect breast cancer varies widely, depending on a woman's age, whether she takes hormonal replacement, the technical quality of the testing equipment, and the skill of the radiologist. Overall, the sensitivity of the test is better for older women than it is for younger women. Unfortunately, there are many false positive tests, and up to one quarter of women who have annual mammograms may need to undergo unnecessary, invasive follow-up testing as a result of false-positive tests

Box 10-21 Breast Cancer Screening with Mammography (with or without clinical breast exam)

Level B evidence. There is fair evidence to support benefit from breast cancer screening for older women by mammogram every 1 to 2 years. There is no age at which screening should be discontinued, but the task force agrees that screening would have no benefit when life expectancy is significantly limited by dementia or other serious, life-limiting chronic illnesses.

Box 10-22

Clinical breast exam screening:
Level I evidence.

Self breast exam screening:
Level I evidence.

from mammography. There have been no studies to look at the effectiveness of clinical breast exam without concurrent mammography to detect breast cancer. Self breast exam has not been found to decrease breast cancer morbidity or mortality, but there have not been enough studies to evaluate the issue.

Colorectal Cancer

Colorectal cancer is both the third most common cancer in the United States and the third leading cause of cancer death in the United States. The prevalence of the disease increases with age, and over 90% of colorectal cancer is diagnosed in clients over the age of 50.

There are several good screening methodologies to detect early colon cancer: fecal occult blood testing (FOBT), sigmoidoscopy, and colonoscopy. Choice of screening test is determined based on client risk factors and preference. Patients who have a history of adenomatous polyps or inflammatory bowel disease or a family history of colorectal cancer or adenomatous polyps should receive colonoscopy. Screening for these high risk clients is begun at an earlier age than for the general population.

Colonoscopy is the most sensitive of the screening methodologies but is associated with the highest costs and risks. These risks include a small risk of perforation and bleeding and the risks associated with sedation required for the procedure.

Commonly used screening strategies for clients of average risk include annual FOBT, sigmoidoscopy performed every 5 years, or a combination of FOBT performed annually with sigmoidoscopy every 5 years, when FOBT testing is negative. If the results of this test are positive, clients are sent for colonoscopy or double contrast barium enema combined with sigmoidoscopy, in cases where colonoscopy is not available. The best methodololgy for FOBT is the three consecutive stool samples that are collected at home by the patient on an annual basis. These tests should be examined without rehydration due to the decreased specificity of the test that is associated with rehydration of the samples. A single guiaic test, performed in the office with DRE, is not recommended as an adequate screening test (National Guideline Clearinghouse, 2005).

There is strong evidence to support colorectal screening for men and women ages 50 and older, but insufficient evidence to determine which of the various screening options is the preferred method for screening.

Box 10-23 Colorectal Screening

Level A recommendation. The task force strongly recommends colorectal screening by FOBT, FOBT + sigmoidoscopy, or sigmoidoscopy alone for clients with average risk of developing colorectal cancer. The task force was unable to determine whether the increased sensitivity of colonoscopy compared with the other screening methods outweighed the costs, risks, and inconvenience of the procedure.

Case Study 10-1

You are working as an RN for a managed care organization. Physicians have complained about their inability to adequately care for their elderly patients given the time constraints imposed by the 20-minute office visit. An innovative strategy, in which RNs meet with all clients over the age of 65 on an annual basis, prior to the physician visit, in order to ensure that recommended screening tests are performed, has been instituted by the HMO.

You are visiting with Hilde M., an 82-year-old female, who is accompanied by her daughter, Roxanne. Roxanne has called you prior to the visit to inform you about her concerns about her mother's ability to live safely alone at home. She confides that her mother is forgetting many appointments, and has fallen at least twice in the past 3 months. Although Hilde had a minor stroke 3 years ago, she has not been into the office for the past year because she lacks transportation since she gave up driving 2 years ago due to her poor vision. Roxanne has encouraged her mother to move into an assisted living facility, but Hilde is loathe to sell her home of 50 years and to give up her independence.

What screening tests are appropriate for Hilde at this time? Justify your choices. What instruments will you use to perform the appropriate screening tests? What counseling will you provide for Mrs. M. and her daughter, based on the limited information you have been provided?

Conclusion

In summary, there are many effective screenings for various diseases common to the elderly population. Nurses should utilize the appropriate resources to obtain and put into practice screening of aged patients (see Table 10-1 for a summary) according to the USPSTF guidelines. Proper screening of older adults can save lives.

Critical Thinking Exercises

1. Iola R., a 72-year-old overweight woman, tells you that she wishes that she could exercise, but that she can never bring herself to begin an exercise program. She knows that her hypertension, diabetes, and high cholesterol would benefit from regular exercise. She is caring for her grandchildren 3 days per week and can't find the time to engage in regular exercise. She is not sure if it is safe to walk alone around her neighborhood anyway. Explain how you could use the concepts of self-management of chronic illness and contracting to help Iola begin an exercise program. What benefits might she obtain through regular exercise? How frequently should she plan to exercise?
2. Mr. Gottlieb complains that he has been falling a lot recently. He can remember at least three falls in the past 6 months, but, luckily, none have resulted in injury yet. His friend is living in a nursing home as a result of complications and debility that followed a hip fracture, and Mr. Gottlieb does not want the same fate for himself. Please describe how you will assess and manage Mr. Gottlieb's fall risk.
3. Mrs. Hall is a 94-year-old woman with Alzheimer's disease. Her daughter is her primary caregiver and calls to report that caring for her mother has become intolerable. "I can't make her eat, drink, or stop her incessant whining." You notice that Mrs. Hall has not been in to see her primary care doctor in over 3 years, but that she has been in to the emergency department four times in the past year for dehydration, urinary tract infections, and behavior management. You want to assess the home situation for safety and provide caregiver support to the patient's daughter. What signs of abuse and neglect might you look for through a chart review? Through a clinic visit and evaluation of the client? Through laboratory testing? How could you get a better assessment of the actual home situation? If your suspicions are strengthened, how will you proceed to intervene with this case of suspected elder abuse and neglect?

Personal Reflection

1. In the case described in #3 of the Critical Thinking Exercises, which of the two clients described, Mrs. H. or her daughter who initially called you, is your primary patient? Do you have loyalties to both? How could you address the care needs of Mrs. H.'s daughter?
2. Do you feel that you can counsel a client about health promotion if you do not adopt these behaviors yourself?
3. Mr. J., an 88-year-old gentleman, had a colonoscopy 6 years ago in which an adenomatous polyp was removed. His gastroenterologist has asked for your help in bringing Mr. J. back for follow-up testing. You call the patient, who tells you that although he recognizes the risk, he is not willing to undergo the procedure again. He believes his life expectancy is limited anyway, and would prefer to not know if he has another polyp because he would not want to undergo surgery anyway. What do you do?

Glossary

Activities of daily living (ADLs): Activities performed in the course of daily life that include bathing, dressing, transferring, walking, eating, and continence.

Adult protective service agency (APS): A social service agency designed to investigate and intervene when complaints of elder abuse or neglect are reported. APS agencies are generally organized as a division of local county government social service agencies.

Chronic Disease Self-Management Program (CDSMP): A care model developed by Dr. Kate Lorig, at the University of Stanford, to facilitate self-management of chronic illnesses. Clients have been shown to benefit by improved self-efficacy when they are taught to improve symptom management, maintain functional ability, and adhere to their medication regimens.

Contracting: A specific agreement between the nurse and client in which a behavior change is described and a plan for the change is committed to paper.

Dietary Approaches to Stop Hypertension (DASH) diet: A diet promoted by the U.S. Department of Health and Human Services that has been proven to be palatable and effective in lowering blood pressure. It is rich in potassium, magnesium, and calcium, and low in salt.

Framingham Heart Study: A 50-year, longitudinal study of over 5,000 subjects designed to identify factors that cause and prevent cardiovascular disease.

Functional decline: Decreased ability to independently perform activities of independent living or instrumental activities of daily living, such as dressing, bathing, shopping, or bill paying.

Healthy People 2010: An initiative of the U.S. Department of Health and Human Services that utilized the skills and knowledge of an alliance of more than 350 national organizations and 250 state public health, mental health, substance abuse, and environmental agencies in order to develop a set of health care objectives designed to increase the quality and quantity of years of

healthy life of Americans and to eliminate health disparities.

Health promotion: Activities aimed at improving or enhancing health.

Health screening: Population-wide efforts to detect early disease.

Instrumental activities of daily living (IADLs): Activities related to independent living that include meal preparation, money management, shopping, housework, and using a telephone.

Nutrition Screening Initiative: A multidisciplinary effort led by the American Academy of Family Physicians and the American Dietetic Association to promote the integration of nutrition screening and dietary interventions into health care for the elderly.

Primary prevention: Activities designed to completely prevent a disease from occurring, such as immunization against pneumonia or influenza.

Secondary prevention: Efforts directed towards early detection and management of disease, such as the use of colonoscopy to detect small cancerous polyps.

Tertiary prevention: Efforts used to manage clinical diseases in order to prevent them from progressing or to avoid complications of the disease, as when beta blockers are used to help remodel the heart in congestive heart failure.

U.S. Preventive Services Task Force (USPSTF): A task force convened by the U.S. Public Health Service to systematically review the evidence of effectiveness of clinical preventive services. The task force is an independent panel of private-sector experts in primary care and prevention whose mission is to evaluate the benefits of individual services and to create age-, gender-, and risk-based recommendations about services that should routinely be incorporated into primary medical care.

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Section 5

Illness and Disease Management (Competencies 14, 15)

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Chapter 11

Management of Common Illnesses, Diseases, and Health Conditions

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LEARNING OBJECTIVES

At the end of this chapter, the reader will be able to:

1. Name the major risk factors associated with cardiovascular disease (CVD).
2. Discuss the impact of the major cardiovascular diseases seen in older adults on the health of the U.S. population.
3. Recognize signs of myocardial infarction that may be unique to the older adult.
4. Utilize resources and research to promote heart-healthy lifestyles in older adults.
5. State the warning signs of stroke.
6. Apply the Mauk model for poststroke recovery to the care of stroke survivors.
7. Identify common treatments for pneumonia, tuberculosis (TB), and chronic obstructive pulmonary disease (COPD).
8. Discuss how to minimize risk factors for common gastrointestinal problems in the elderly.
9. Describe nursing interventions for patients dealing with gastroesophageal reflux disease (GERD).
10. Discuss the most common urinary problems seen in the elderly.
11. Differentiate among the different forms of incontinence.
12. Identify signs, symptoms, and treatments for benign prostatic hyperplasia (BPH) and vaginitis.
13. Recognize common treatments for several cancers in older adults: bladder, prostate, colorectal, cervical, and breast.
14. List several medications that can contribute to male impotence.

15. Recognize the clinical treatments for persons with Parkinson's disease (PD).
16. Devise a nursing care plan for the person with Alzheimer's disease (AD).
17. Discuss possible causes and solutions for dizziness in the elderly.
18. List the modifiable risk factors for osteoporosis.
19. Distinguish between osteoarthritis and rheumatoid arthritis in relation to typical presentation, treatment, and long-term implications.
20. Contrast rehabilitative care for older adults with hip and knee replacement surgery.
21. Describe the most effective way to condition a stump to promote use of a prosthesis.
22. Distinguish signs and symptoms of cataracts, glaucoma, macular degeneration, and diabetic retinopathy.
23. Contrast management of the four most common eye disorders seen in the elderly.
24. Distinguish among the three major types of skin cancer.
25. Identify signs and symptoms of herpes zoster appearing in the elderly.
26. Review prevention of the most common complications of diabetes in older adults.
27. Devise a plan for good foot care for older adults with diabetes.
28. Synthesize knowledge about hypothyroidism into general care of the older adult.
29. Discuss the causal factors, symptoms, and management of delirium in older adults.

KEY TERMS

- Activities of dailing living (ADLs)
- Age-related macular degeneration (ARMD)
- Alzheimer's disease (AD)
- Angina
- Atherosclerosis
- Benign paroxysmal positional vertigo (BPPV)
- Benign prostactic hyperplasia (BPH)
- Bone mineral density (BMD)
- Cataracts
- Cerbrovascular accident (CVA)
- Chronic bronchitis
- Chronic obstructive pulmonary disease (COPD)
- Congestive heart failure (CHF)
- Continuous bladder irrigation (CBI)
- Corneal ulcer
- Coronary artery disease (CAD)
- Cornonary heart disease (CHD)
- Cystectomy
- Delirium
- Detrusor
- Diabetic retinopathy
- Diverticulitis

- Dysphagia
- Emphysema
- Erectile dysfunction (ED)
- Functional incontinence
- Gastroesophageal reflux disease (GERD)
- Glaucoma
- Gonioscopy
- *Helicobacter pylori*
- Hemiparesis
- Hemiplegia
- Herpes zoster
- Histamine 2 (H_2) blockers
- Hypertension (HTN)
- Incontinence
- Instrumental activities of daily living (IADLs)
- Intraocular pressure (IOP)
- Kegel exercises
- Mauk model for poststroke recovery
- Meniere's syndrome
- Mini Mental State Examination (MMSE)
- Mixed incontinence
- Myocardial infarction (MI)
- Osteoporosis
- Otoconia
- Overflow incontinence
- Parkinson's disease (PD)
- Peripheral artery disease (PAD)
- Peripheral vascular disease (PVD)
- Phantom limb pain
- Proliferative retinopathy
- Prostate-specific antigen (PSA)
- Proton pump inhibitors (PPIs)
- Radical prostatectomy
- Reflex incontinence
- Retinal detachment
- Scatter laser treatment
- Stress incontinence
- Stroke
- Tinnitus
- Tonometer
- t-PA (tissue plasminogen activator)
- Transient ischemic attack (TIA)
- Transurethral resection of the prostate (TURP)
- Tuberculosis (TB)
- Urge incontinence
- Urostomy
- Vitrectomy

The purpose of this chapter is to present basic information related to common diseases and disorders experienced by older adults. It is assumed that the reader of this text has fundamental nursing knowledge and will study disease processes more in depth in other courses. Extensive discussion of the nursing care and treatment of each disease is beyond the scope of this book, but nurses are encouraged to refer to traditional medical-surgical textbooks for further reading. The discussion in this chapter will use a systems approach to provide essential information regarding background, risk factors, signs and symptoms, diagnosis, and usual treatment, while emphasizing any important aspects unique to care of the elderly with each disorder. Chapter 12 provides a thorough discussion of some additional common problems.

Cardiovascular Problems

Several conditions and diseases related to the cardiovascular system are common in older adults. The specific conditions discussed in this section include myocardial infarction, hypertension, angina, congestive heart failure, coronary artery disease, stroke, and peripheral vascular disease.

The American Heart Association (AHA) stated that in 2002, cardiovascular disease accounted for 38% of all deaths in the United States (2005a). There are more than 27 million American adults age 65 or older with some form of cardiovascular disease (CVD), making it a significant health problem among the elderly. In the United States, 38% of all deaths in 2002 were attributed to CVD (AHA, 2005a). In Canada, 34% of all male deaths and 36% of all female deaths in 2000 were due to heart disease and stroke (Heart and Stroke Foundation of Canada, 2005). The AHA lists the following as the major cardiovascular diseases: **hypertension (HTN), coronary heart disease** ([CHD] includes **myocardial infarction** and **angina**), **congestive heart failure (CHF)**, and **stroke**. These will be discussed in the following sections.

Hypertension

Approximately 65 million Americans have a blood pressure of 140/90 or higher, have been diagnosed with hypertension (HTN), or have high blood pressure. African American males have the highest incidence of HTN of all groups, resulting in an increase in the number of strokes and heart disease in this population. Blacks have a 1.8 times greater risk than whites of having a fatal stroke, and 4.2 times greater chance of developing end stage renal disease (AHA, 2005a).

Blood pressure is determined by many factors, some of which, such as the condition of the heart and blood vessels, are influenced by age.

Box 11-1 Resources About Cardiovascular Disease

American Heart Association
1-800-AHA-USA1
1-800-242-8721
www.americanheart.org

American Society of Hypertension (ASH)
www.ash-us.org

American Stroke Association
1-888-4-STROKE
1-888-478-7653
www.strokeassociation.org

Heart and Stroke Foundation of Canada
www.heartandstroke.ca

Heart and Stroke Foundation of Alberta, Canada
ww2.heartandstroke.ab.ca

National Emergency Medical Association
www.nemahealth.org

National Institute of Neurological Disorders and Stroke
www.ninds.nih.gov

National Stroke Association
www.stroke.org

South African Heart Association
www.saheart.org

Over 95% of hypertension is called "essential" hypertension, that is, it has no known cause (National Institutes of Health, 2005). High blood pressure may also result from disease processes. Additionally, those with prehypertension, a systolic blood pressure between 120 and 139 or a diastolic blood pressure between 80 and 89 on multiple readings, should receive a recommendation to make lifestyle changes, because

they often develop hypertension. Diagnosis of hypertension should be based on several readings at different times or visits to the physician.

Risk factors for hypertension include family history, ethnicity, poor diet, being overweight, excessive alcohol intake, a sedentary lifestyle, and certain medications (**Table 11-1**). A blood pressure consistently under 120/80 is desirable. As persons age, the systolic blood pressure (the measure of the heart at work) tends to rise, but because of the significant risk of stroke associated with hypertension, older adults are being treated earlier and more aggressively than in years past. Although some clinicians may consider HTN in the elderly as a blood pressure greater than 160/90, because of the rise in systolic blood pressure with age those with isolated systolic HTN (i.e., a systolic BP over 140 and a diastolic BP less than 90) should be aggressively treated (Reuben et al., 2004).

Lifestyle modifications may help older adults to control blood pressure. Table 11-2 lists recommended strategies for older adults. Several medications may be used to treat hypertension in the elderly (**Table 11-3**). The goal of medical treatment in older adults is to lower the blood pressure to between 140/90 and 120/80. Thiazide diuretics or beta blockers are often used as drugs of choice for the elderly who do not have other coexisting medical conditions. It is not uncommon for older adults to require more than one and even up to several medications to achieve adequate control. In fact, combination therapy for older adults "allows for smaller doses of each drug and thus avoids unpleasant side effects" (Tully, 2002, p. 36). The most common combinations are a thiazide diuretic with either a potassium-sparing diuretic, a beta blocker, or a calcium agonist.

Older adults should work with their physicians and nurses to achieve good control of their blood pressure, because it is a risk factor and contributor to many other serious health conditions including heart disease and stroke. Nurses may need to do extensive teaching about lifestyle modifications to assist older adults with smoking cessation and appropriate dietary choices. Remember that in addition to promoting nutrition, nurses should teach patients to read labels, avoid processed foods, prepare foods appropriately, and drink adequate amounts of fluids to stay hydrated.

Table 11-1 Risk Factors for Hypertension

Heredity
Race (African American)
Increased age
Sedentary lifestyle
Male gender
High sodium intake
Diabetes or renal disease
Heavy alcohol consumption
Obesity
Pregnancy
Some oral contraceptives
Some medications

Source: AHA, 2005.

Coronary Heart Disease

Coronary heart disease (CHD), also called **coronary artery disease (CAD)** or ischemic heart disease, affects millions of people each year in many countries. This condition is caused by hardening and narrowing of the blood vessels of the heart (**atherosclerosis**), resulting in an impaired blood supply to the myocardium. Thirteen million Americans are affected each year. The rates for older females after menopause are more than twice that of older females prior to menopause. Over 83% of people who die

Table 11-2 STRATEGIES TO HELP OLDER ADULTS CONTROL HIGH BLOOD PRESSURE

Limit alcohol intake to one drink per day.
Limit sodium intake.
Stop smoking.
Maintain a low fat diet that still contains adequate vitamins and minerals by adding leafy green vegetables and fruits.
Do some type of aerobic activity nearly every day of the week.
Lose weight (even 10 pounds may make a significant difference).
Have blood pressure checked regularly. Report any significant rise in blood pressure to the physician.
Take medications as ordered. Do not skip doses.

with CHD are age 65 years and over (AHA, 2005a). Myocardial infarction and angina are two results of CHD that will be discussed here.

ANGINA

Angina pectoris is chest pain that results from lack of oxygen to the heart muscle. A small number of deaths are attributed to this cause each year, but mortality statistics related to angina are often included with CHD reports. Only about 20% of heart attacks are preceded by diagnosed angina. Among Americans ages 40–74, the prevalence of angina is slightly higher for females, significantly higher for Mexican American males and females, and slightly higher, though not significantly so, for African American females (AHA, 2005a).

Table 11-3 SOME TYPES OF MEDICATIONS USED TO TREAT CARDIOVASCULAR DISEASE

Classification	Action	Example
+Diuretics	Decrease water and salt retention	Furosemide (Lasix)
+Beta-blockers	Lower cardiac output and heart rate	Atenolol (Tenormin)
+ACE inhibitors	Block hormone that causes artery constriction	Captopril (Capoten)
+Central alpha agonists	Block constriction of vessels	Clonidine (Catapres)
+Calcium channel blockers	Relax blood vessels to the heart	Amlodipine (Norvasc)
+Angiotensin II receptor blockers	Relax blood vessels by blocking angiotensin II	Irbesartan (Avapro)
+Vasodilators	Relax the walls of the arteries	Hydralazine (Apresoline)
*Digitalis	Strengthens and slows the heart	Digoxin (Lanoxin)
*Potassium	Helps control heart rhythm	K-Dur, K-Tab
*Blood thinners	Prevent clots	Warfarin (Coumadin); Heparin

+Medications used for both CHF and HTN
**Medications used for CHF*

Angina is usually the first symptom of CAD in the older adult. It is classified as stable or unstable. Although the symptoms of angina may be similar to myocardial infarction, there are several differences that are of note. Angina often occurs related to exercise or stress and is relieved by rest and/or nitroglycerin. The associated chest pain is generally shorter (less than 5 minutes) than MI, though the classic presentation is squeezing pain or pressure in the sternal area. Older adults with angina may first complain of dyspnea, dizziness, or confusion versus classic chest pain (Tully, 2002). In addition to a thorough history and checking vital signs, a 12-lead EKG and lab tests will help rule out or confirm an MI.

Treatment is ongoing for angina. Unstable angina may require hospitalization, whereas stable angina can be managed with medication and lifestyle modifications aimed at reducing the workload on the heart and the accompanying oxygen demand. Teaching of patients and families will include weight management, stress management, limiting caffeine, smoking cessation, an exercise regimen that considers the person's myocardial capacity, control of hypertension, and medical management of any coexisting endocrine disorder (such as hyperthyroidism). Beta blockers and calcium channel blockers are often prescribed to decrease the oxygen demand on the heart. Patients should be alerted to side effects from these medications such as fatigue, drowsiness, dizziness, and slow heart rate.

Myocardial Infarction

There are 365,000 new and 300,000 recurrent heart attacks each year in the United States. The risk of MI increases with age, with an average age for a person's first MI of 65.8 for men and 70.4 for women (AHA, 2005a). In Canada, 70,000 persons are affected by MI each year, with 20,926 dying of heart attack in 1999 (Heart and Stroke Foundation of Canada, 2005).

Risk factors for MI include hypertension, race (especially African American males with HTN), high fat diet, sedentary lifestyle, diabetes, obesity, high cholesterol, family history, cigarette smoking, excessive alcohol intake, and stressful environment. Many of these risk factors are modifiable or controllable. Warning signs of MI are listed in Table 11-4.

"Thrombolytic therapy, if administered early in the course of MI, significantly reduces the morbidity and mortality associated with MI" (Tully, 2002, p. 40). The following steps are recommended if possible while awaiting emergency treatment:

1. Have the patient rest.
2. Provide supplemental oxygen.
3. Give nitroglycerin sublingually every 5 minutes times three and monitor vitals signs.
4. Give aspirin if not contraindicated.

Table 11-4 Warning Signs of Heart Attack

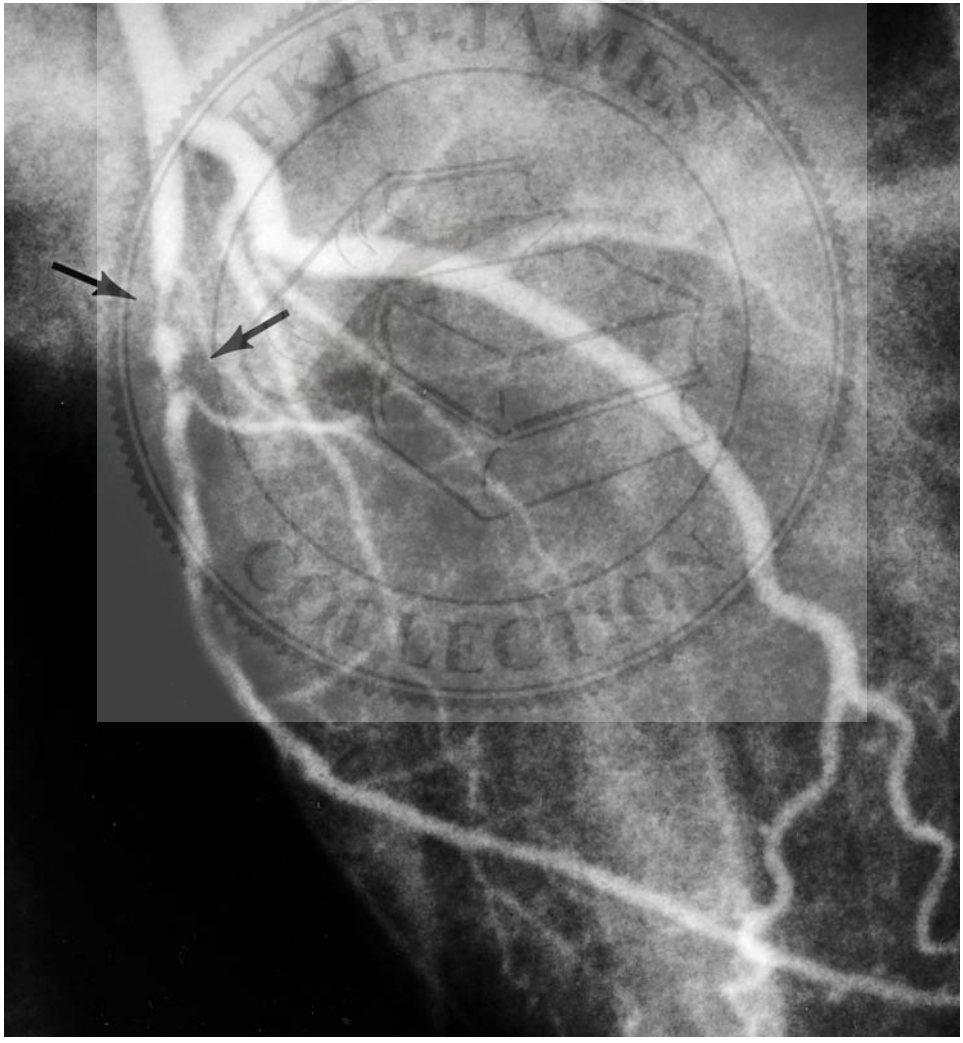
Chest pain appearing as tightness, fullness, or pressure
Pain radiating to arms
Unexplained numbness in arms, neck, or back
Shortness of breath with or without activity
Sweating
Nausea
Pallor
Dizziness
*Unexplained jaw pain
*Indigestion or epigastric discomfort, especially when not relieved with antacids

**Of particular significance in the elderly*

Some nurses use the mnemonic MONA (morphine, oxygen, nitroglycerin, aspirin) to remember the steps in acute care treatment of MI.

Diagnosis may include a variety of tests including EKG and angiogram or cardiac catheterization to visualize any areas of blockage. **Figure 11-1** shows the results of an angiogram with some degree of blockage in a major heart vessel. Such procedures are generally done in a special cath lab within a heart center or hospital by a

Figure 11-1 Coronary angiogram illustrating segmental narrowing (*arrows*).

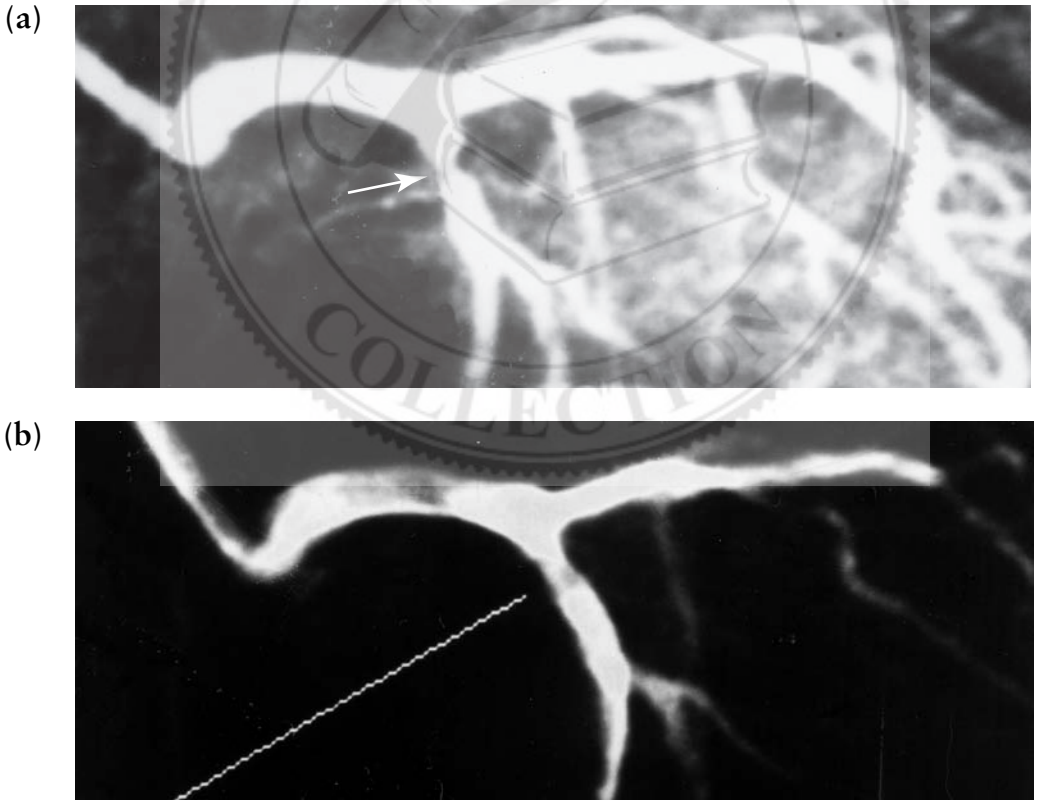


Source: Leonard Crowley, *Introduction to Human Disease* (6th ed.). Sudbury, MA: Jones and Bartlett Publishers, 2005.

cardiologist. Important nursing interventions after these procedures include keeping the leg straight with pressure on the femoral artery entry site per the facility's protocol. Instruction of the patient and family after this outpatient procedure should include emphasis on the importance of monitoring the entry site. Patients should be taught that bleeding at the site is considered an emergency and that firm, direct pressure must be applied to the site immediately. It is common for bruising to occur, and limits to lifting and driving should be strictly followed postprocedure to prevent complications.

Usual medical treatment of MI includes several options, depending on the results of the diagnostic tests and extent of damage and blockage. Angioplasty (**Figure 11-2**) is a common procedure that uses a balloon or other device to open the blocked vessel. Coronary artery bypass graft (CABG), commonly known as "open heart

Figure 11-2 Coronary angioplasty. **A,** Severely narrowed coronary artery (*arrow*) shown by angiogram. **B,** Same artery after successful dilation by angioplasty.



Source: Leonard Crowley, *Introduction to Human Disease* (6th ed.). Sudbury, MA: Jones and Bartlett Publishers, 2005.

surgery," is often used for those with several major arteries blocked in order to restore blood flow (**Figure 11-3**). Pharmacological treatment may include beta blockers, angiotensin-converting enzyme (ACE) inhibitors, and antihypertensives, to name a few. The recovery period will include careful monitoring in cardiac intensive care, then progression to cardiac rehabilitation in which patients will be closely monitored after discharge and assisted by specialized nurses to make lifestyle modifications to promote maximal recovery and return to function.

Persons surviving a heart attack should be dedicated to reducing risk factors associated with

Figure 11-3 Vein graft extending from aorta above the origin of the coronary arteries to the anterior interventricular (descending) coronary artery distal to the site of arterial narrowing.

Source: Leonard Crowley, *Introduction to Human Disease* (6th ed.). Sudbury, MA: Jones and Bartlett Publishers, 2005.

Table 11-5 Strategies for Older Adults to Reduce Risk of Heart Attack

Exercise regularly.
Do not smoke.
Eat a balanced diet with plenty of fruits and vegetables; avoid foods high in saturated fats.
Maintain a healthy weight.
Manage stress appropriately.
Control existing diabetes by maintaining healthy blood sugars and take medications as prescribed.
Limit alcohol intake to 1 drink per day for women and 2 drinks per day (or less) for men.
Visit the doctor regularly.
After a heart attack, participate fully in a cardiac rehabilitation program.
Involve the entire family in heart-healthy lifestyle modifications.
Report any signs of chest pain immediately.

heart disease. **Table** 11-5 lists several strategies for older adults to prevent a first or recurring heart attack. Nurses should encourage patients to attend cardiac rehabilitation programs during the posthospitalization period. Zucker (2002) stated that "unless patients are consistently referred to cardiac rehabilitation or are followed closely after discharge, they have little support as they attempt to incorporate and maintain new, healthier behaviors" (p. 187). Support groups for survivors and families may also be helpful. Family members, particularly spouses, should be included in the rehabilitation process (**Case Study** 11-1).

Congestive Heart Failure (CHF)

The incidence of congestive heart failure (CHF) is 10 per 1,000 people over the age of 65. The lifetime risk for someone to have CHF is 1 in 5. The risk of CHF in older adults doubles for those with blood pressures over 160/90. Seventy-five percent of those with CHF also have hypertension (AHA, 2005a). The major risk factors for CHF are diabetes and MI. CHF often occurs within 6 years after a heart attack.

Signs and symptoms of heart failure are many; these appear in **Table** 11-6. It is essential that older adults diagnosed with CHF recognize signs of a worsening condition and report them promptly to their health care provider. Older adults may present with atypical symptoms such as decreased appetite, weight gain of a few pounds, or insomnia (Amella, 2004). In the office or long-term care setting, O_2 saturation levels can be easily monitored. An O_2 saturation of less than 90% in an older person is cause for concern and further investigation.

Treatment for CHF involves the usual lifestyle modifications discussed for promoting a healthy heart (Table 11-5), as well as several possible types of medications. These include ACE inhibitors, diuretics, vasodilators, digoxin, beta blockers, blood thinners, angiotensin II blockers, calcium channel blockers, and potassium. Most CHF is managed with lifestyle modifications and medications; however, in extreme cases, surgery may be a treatment option if valvular repair/replacement or heart transplant becomes necessary.

In addition, nurses should teach older adults about lifestyle modifications that can decrease and/or help manage the workload on the heart. To minimize exacerbations, patient and family

Case Study 11-1

Mr. Jones is a 62-year-old man who lives next door to you. He comes over while you are out in your yard and says, "You're a nurse, so I have this question for you. I have had this annoying heartburn all day that just doesn't go away no matter what I do." He points to his epigastric area. "It just feels like this pressure right here and makes me a little sick to my stomach." Mr. Jones looks pale and a bit diaphoretic.

Questions:

1. What is your best response to this situation?
2. What could these signs and symptoms indicate?
3. What would you expect Mr. Jones to do at this point?
4. Are there any other questions you could ask that would provide additional information about the potential seriousness of his complaint?

counseling should include teaching about the use of medications to control symptoms and the importance of regular monitoring with a health care provider (Johnson, 1999). These appear in Table 11-7. With a proper combination of treatments such as lifestyle changes and medications, many older persons can still live happy and productive lives with a diagnosis of heart failure, and minimize their risk of complications related to this disease.

Table 11-6 SIGNS AND SYMPTOMS OF HEART FAILURE

Shortness of breath
Edema
Coughing or wheezing
Fatigue
Lack of appetite or nausea
Confusion
Increased heart rate

Source: AHA, 2005.

Stroke

Stroke, also known as **cerebrovascular accident (CVA)** or brain attack, is an interruption of the blood supply to the brain that may result in devastating neurological damage and disability or death. Approximately 700,000 people in the United States have a new or recurrent stroke each year (ASA, 2005). Stroke accounted for 1 in 15 deaths in 2002, making it the third leading cause of death. In Canada, stroke is the

Table 11-7 Lifestyle Modifications to Teach Older Adults with Heart Failure

Limit or eliminate alcohol use (no more than 1 oz. ethanol per day = one mixed drink, one 12 oz. beer, or one 5 oz. glass of wine).
Maintain a healthy weight. Extra pounds put added stress and workload on the heart. Weigh daily and report weight gains of 5 pounds or more to health care provider.
Stop smoking (no tobacco use in any form).
Limit sodium intake to 2–3 g per day—read the labels: avoid canned and processed foods. Take care with how foods are cooked or prepared at home (e.g., limit oils and butters).
Take medications as ordered—do not skip doses. Report any side effects to the physician.
Exercise to tolerance level—this will differ for each person. Remain active without overdoing it.
Alternate rest and activity. Learn energy conservation techniques.

fourth leading cause of death, affecting 50,000 people each year (Heart and Stroke Foundation of Canada, 2005).

Assessment and Diagnosis

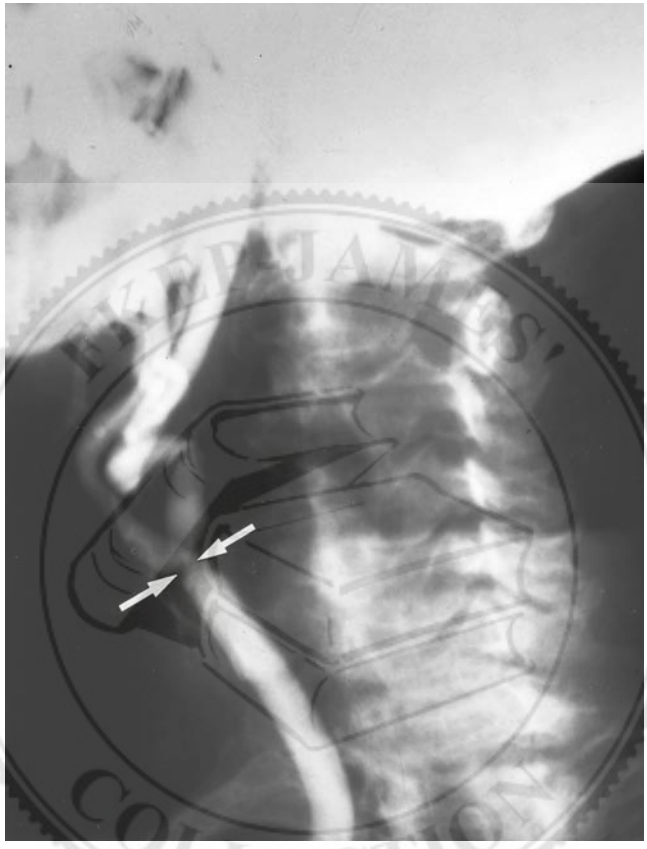
There are two major types of stroke: ischemic and hemorrhagic. The vast majority of strokes are caused by ischemia (88%), usually from a thrombus or embolus. The symptoms and damage seen depend on which vessels in the brain are blocked. Carotid artery occlusion is also a common cause of stroke related to stenosis (**Figure 11-4**).

Some risk factors for stroke are controllable and others are not. These risk factors appear in **Table 11-8**. The most significant risk factor for stroke is hypertension. Controlling high blood pressure is an important way to reduce stroke risk. Those with a blood pressure of less than 120/80 have half the lifetime risk of stroke as those with hypertension (ASA, 2005). Although the American Stroke Association and the National Stroke Association have funded national campaigns to promote education about the warning signs of stroke, in persons age 75 or older, blacks and males were found to be the least knowledgeable about these signs (ASA, 2005), emphasizing the continued need for education among older age groups. Smoking 40 or more cigarettes per day (heavy smoking) increases the stroke risk to twice that of light smokers. If a person quits smoking, their risk after 5 years mirrors that of a nonsmoker, so older adults should be particularly encouraged to stop smoking.

Several warning signs are common with stroke (**Table 11-9**). Thromboembolic strokes are more likely to show classic signs than hemorrhagic strokes that may appear as severe headaches but with few other prior warning signs. A quick initial evaluation for stroke can be summed up by assessing for three easy signs: facial droop, motor weakness, and language difficulties.

Other warning signs of stroke include a temporary loss of consciousness or the appearance of the classic warning signs that go away quickly (**Case Study 11-2**). **Transient ischemic attacks (TIAs)** are defined as those symptoms similar to stroke that go away within 24 hours (and usually within minutes) and leave no residual effects. Most TIAs in whites are from atherothrombotic disease,

Figure 11-4 Angiogram showing narrowed carotid artery.



Source: Leonard Crowley, *Introduction to Human Disease* (6th ed.). Sudbury, MA: Jones and Bartlett Publishers, 2005.

with another 20% from cardiac emboli and 25% from occlusion of smaller vessels (Warlow, Sudlow, Martin, Wardlaw, & Sandercock, 2003). At least 10% of those having a TIA will go on to have a stroke within a year (ASA, 2005).

Older adults experiencing the warning signs of stroke should seek immediate treatment by activating the emergency response system in their area. Transport to an emergency medical facility for evaluation is essential for the best array of treatment options. A history and neurological exam, vital signs, as well as diagnostic tests including electrocardiogram (ECG), chest x-ray, platelets, prothrombin time (PT), partial thromboplastin time (PTT), electrolytes, and glucose are routinely ordered. Diagnostic testing may include computed tomography (CT) without contrast, magnetic resonance imaging (MRI), arteriography, or ultrasonography to determine the type and location of the stroke.

Table 11-8 Risk Factors for Stroke

Controllable	Uncontrollable
Hypertension	Advanced age
High cholesterol	Gender (males more than females until menopause)
Heart disease	Race (African Americans more than whites)
Smoking	Heredity
Obesity	
Stress	
Diabetes	

Acute Management

The first step in treatment is to determine the cause or type of stroke. A CT scan or MRI must first be done to rule out hemorrhagic stroke (**Figure 11-5**). Hemorrhagic stroke treatment often requires surgery to evacuate blood and stop the bleeding.

The gold standard at present for treatment of ischemic stroke is **t-PA (tissue plasminogen activator)**. At this time, t-PA must be given within 3 hours after the onset of stroke symptoms. This is why it is essential that older adults seek treatment immediately when symptoms begin. T-PA is ineffective after the 3-hour window. New treatments are being explored to extend this window, including the use of a synthetic compound derived from bat saliva that contains an anticoagulant-type property. The major side effect of t-PA is bleeding. T-PA is not effective for all patients, but may reduce or eliminate symptoms in over 40% of those who receive it at the appropriate time (Higashida, 2005). Other much less common procedures such as angioplasty, laser emulsification, and mechanical clot retrieval may be options for treatment of acute ischemic stroke.

Additionally, the use of cooling helmets to decrease the metabolism of the brain is thought to preserve function and reduce ischemic damage. The roles of hyperthermia, hyperglycemia, and hypertension are all being further explored, as these are known to be associated with mortality and other poor outcomes related to ischemic stroke.

To prevent recurrence of stroke, medications such as aspirin, ticlopidine (Ticlid), Plavix, dipyridamole (Persantine), heparin, coumadin, and lovenox may be used to prevent clot formation. Once the stroke survivor has stabilized, the long process of rehabilitation begins. Each stroke is different depending on location and severity, so persons may recover with little or no residual deficits, or an entire array of devastating consequences.

The effects of stroke vary, but may include **hemiplegia**, **hemiparesis**, visual and perceptual deficits, language deficits, emotional changes, swallowing dysfunction, and bowel and bladder problems. Although the deficits that present themselves depend on the area of brain damage, it is sometimes helpful to picture most strokes as involving one side of the body or the other. A person with left brain injury presents with right-sided weakness or paralysis, and a person with

Table 11-9 Warning Signs of Stroke

- Sudden numbness or weakness of face, arm, or leg, especially on one side of the body
- Sudden confusion; trouble speaking or understanding
- Sudden trouble seeing in one or both eyes
- Sudden trouble walking, dizziness, loss of balance or coordination
- Sudden severe headache with no known cause

Source: NSA, 2005, p. 1.

Case Study 11-2

Your grandfather is 85 years old and tells you at a family gathering that yesterday he had some blurred vision and numbness down his right arm. He didn't tell his wife or anyone else because the symptoms went away within 10 minutes, but he wanted to tell you just in case he should have it checked out.

Questions:

1. What should you tell your grandfather? What do his symptoms possibly indicate?
2. What risk factor does he have for stroke?
3. What other questions should you ask to gain more information?
4. What is the next step of action that your grandfather should take?
5. Should anything be discussed with his wife? If so, what?
6. Are there specific topics that should be taught at this point to your grandfather?

right-sided stroke presents with left-sided weakness or paralysis. Table 11-10 lists common deficits caused by stroke, seen in varying degrees, and some common problems associated with strokes on one side of the brain versus the other.

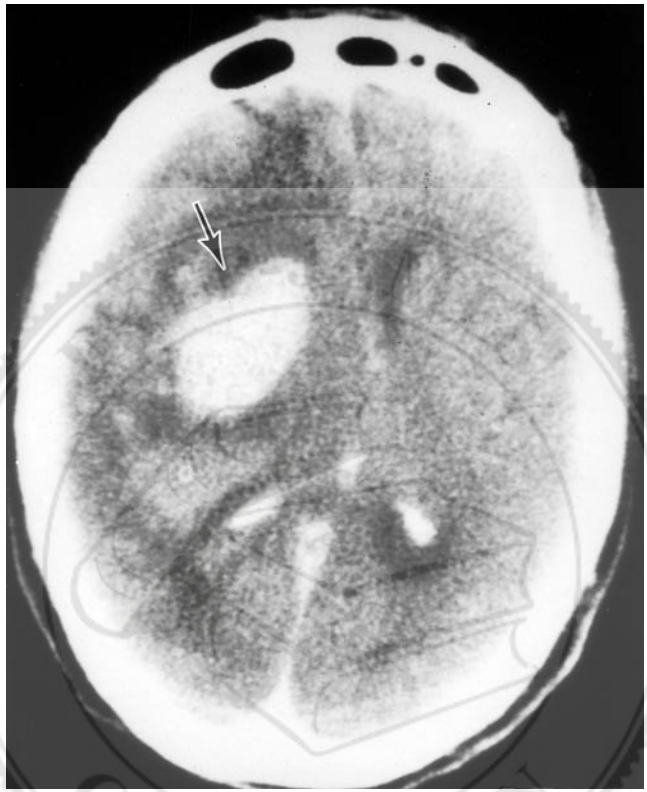
POST-STROKE REHABILITATION

Rehabilitation after a stroke focuses on several key principles. These include maximizing functional ability, preventing complications, promoting quality of life, encouraging adaptation, and enhancing independence. Rehabilitation emphasizes the survivor's abilities, not disabilities, and helps him or her to work with what he or she has while acknowledging what was lost.

If significant functional impairments are present, evaluation for transfer to an intensive acute inpatient rehabilitation program is recommended. Inpatient rehabilitation units offer the survivor the best opportunity to maximize recovery, including functional return. An interdisciplinary team of experienced experts including nurses, therapists, physicians, social workers, and psychologists will help the survivor and the family to adapt to the changes resulting from the stroke. Although the goal of rehabilitation will usually be discharge back to the previous home environment, this is not always possible. Advanced age and functional capacity, particularly ambulatory ability, may be predictors of discharge to a nursing home (Lutz, 2004).

Research by Easton (Mauk) (1999, 2001) demonstrated through grounded theory development that stroke survivors seem to go through a common process of recovery (**Box 11-2**). The **Mauk model for poststroke recovery** can

Figure 11-5 CT scan showing cerebral hemorrhage.



Source: Leonard Crowley, *Introduction to Human Disease* (6th ed.). Sudbury, MA: Jones and Bartlett Publishers, 2005.

help guide nursing practice by suggesting focused interventions for each of the six phases of stroke recovery. **Tables 11-11 and 11-12** list the major concepts and subconcepts of the model (**Figure 11–6**) and the major tasks for survivors and nurses.

Many survivors will need time to work through the first two phases of stroke recovery: agonizing and fantasizing. During this time, the person may be in denial about the consequences of the stroke and feel that soon everything will go back to "normal." Family members also may express these feelings. Survival and ego protection are the main goals of these early phases. The length of time a survivor spends in these early phases of recovery may be buffered by certain factors, as presented in the model. For example, older adults may spend less time agonizing over what has happened because they expected some health problems would come with advanced age, whereas younger persons may struggle more

Table 11-10 COMMON DEFICITS CAUSED BY STROKE

Common Characteristics Associated with Stroke of Either Side	Right Hemisphere Stroke	Left Hemisphere Stroke
Weakness/paralysis	Left hemiparesis or hemiplegia	Right hemiparesis or hemiplegia
Fatigue	Left homonymous hemianopsia	Right homonymous hemianopsia
Depression	Difficulty with cognitive tasks such as spatial-perceptual tasks, sequencing, following, multi-step instructions, and writing	Aphasia (especially expressive type)
Emotional lability	Memory deficits related to performance	Reading/writing problems
Some memory impairment	May not recognize or accept limitations or deficits	Dysarthria
Sensory changes	Overestimating abilities	Dysphagia
Social isolation	Impulsive	Anxiety when trying new tasks
Altered sleep patterns	Quick movements	Tendency to worry and be easily frustrated
	Anosognosia or other forms of left-sided neglect	Slow, cautious
	Impaired judgment	Memory deficits related to language
	Inappropriately low anxiety	
	Higher risk for falls due to lack of safety awareness	
	Deficits less easily recognized by others	

Source: Adapted from Easton, 1999, p. 198, with permission of author.

with the realities of stroke before being able to move on with rehabilitation.

As suggested by the Mauk model, once a stroke survivor has been medically stabilized and realizes the reality of the stroke situation, the focus of care will shift from survival to adaptation and adjustment. Nursing diagnoses common to stroke rehabilitation appear in **Table 11-13**. The Mauk model suggests that survivors do not fully participate in the recovery or rehabilitation process until they work through the realizing phase in which they begin to acknowledge that the effects of the stroke may not just go away. During this time, strong emotions such as anger and depression may surface. Depression is common after stroke, and may be decreased by interventions that support the older adult's right to make choices and be supported in self-determination activities that enhance autonomy (Castellucci, 2004). As stroke survivors continue to receive support and appropriate interventions to facilitate the recov-

Box 11-2 Research Highlight

Aim: To discover the process of recovery after stroke

Methods: Using grounded theory development, a concept analysis, concept synthesis, and subsequent theory synthesis was done. The researcher reviewed the literature on the writings as well as videotapes of stroke survivors as initial data. From this theoretical work, a model with six phases of poststroke recovery emerged. The researcher then conducted face-to-face interviews with stroke survivors until data saturation ($n = 18$) was reached, refining concepts and subconcepts of the model.

Findings: The six phases of poststroke recovery emerging from the data were labeled in a model: agonizing, fantasizing, realizing, blending, framing, and owning. Assumptions and relational propositions were suggested by the model. The researcher further identified essential tasks for each phase (Table 11-12). These phases describe the process of poststroke recovery. Certain factors seemed to facilitate the recovery process including social and spousal support, expectations related to health, advanced age, faith in God, life experience in dealing with losses, and knowing the cause of the stroke.

Conclusion: By using the Mauk model for poststroke recovery, nurses can more efficiently target their care by focusing nursing interventions unique to the phase of recovery in which survivors are. Nurses should assess the phase of recovery and focus care interventions related to the essential tasks for each phase.

Source: Easton-Mauk, K. L. (2001). *The poststroke journey: From agonizing to owning.* Doctoral dissertation. Wayne State University, Detroit, MI: Author.

ery process, they move into the last three phases of blending the old life with the new (after stroke), framing the experience in light of past and familiar experiences, and owning the fact that the stroke occurred and they will accept it and go on with a productive life. A qualitative, longitudinal study of patient expectations of recovery after stroke showed that stroke survivors maintained high expectations for recovery during the first 3 months (Wiles, Ashburn, Payne, & Murphy, 2002). Realistic expectations can be reinforced by therapists and nurses, but it is important not to destroy hope of an increased quality of life.

Patient and Family Education

A large amount of teaching is often done by stroke rehabilitation nurses who work with older survivors. Training informal caregivers has been shown to improve quality of life for stroke survivors and their caregivers, and to decrease costs over time (Kalra et al., 2004). Many topics may need to be covered, depending on the extent of brain damage that has occurred. Some topics should be addressed with all survivors and their families. These include knowing the warning signs of stroke and how to activate the emergency response system in their neighborhood, managing high blood pressure (and how

Table 11-11 THE SIX PHASES (CONCEPTS) OF THE POSTSTROKE JOURNEY WITH CHARACTERISTICS (SUBCONCEPTS)

Phase/Concept	Characteristics/Subconcepts
Agonizing	Fear, shock/surprise, loss, questioning, denial
Fantasizing	Mirage of recovery, unreality
Realizing	Reality, depression, anger, fatigue
Blending	Hope, learning, frustration, dealing with changes
Framing	Answering why, reflection
Owning	Control, acceptance, determination, self-help

Source: Easton, K. L. (2001). *The poststroke journey: From agonizing to owning.* Doctoral dissertation. Wayne State University. Detroit, MI: Author.

hypertension is the number one risk factor for stroke), understanding what medications are ordered as well as how often to take them and why, the importance of regular doctor visits, preventing falls and making the home environment safe, available community education and support groups, and the necessity of maintaining a therapeutic regimen and lifestyle to decrease the risk of complications and recurrent stroke. All survivors will need assistance in reintegrating into the community. This is generally begun in the rehabilitation setting.

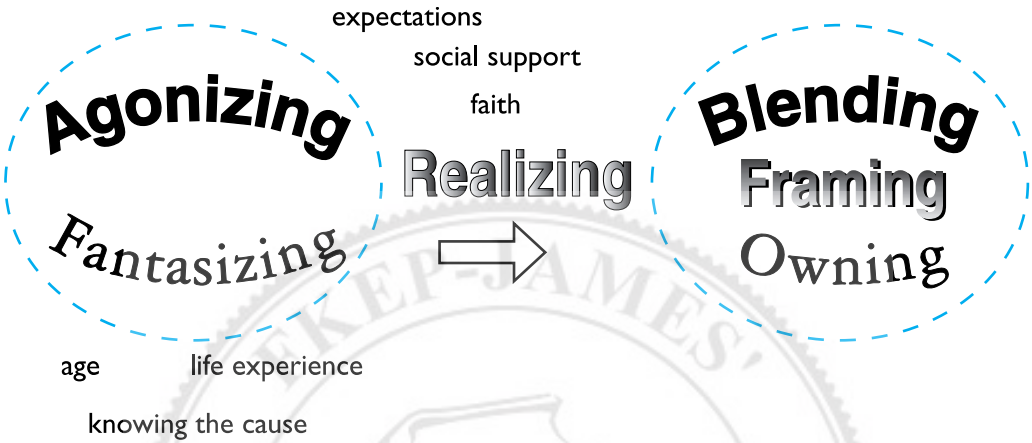
Family caregivers of stroke survivors must also deal with many issues. A classic study by Mumma (1986) revealed that stroke patients and their spouses perceived losses in such areas as mobility, traveling, the ability to do certain desired activities, and independence. A study by Pierce and colleagues (2004) revealed that families dealing with stroke survivors identified five top self-care needs that they wished to have information about: preventing falls, maintaining adequate nutrition, staying active, managing stress, and dealing with emotional and mood changes.

Table 11-12 SUMMARY OF MAJOR SURVIVOR AND NURSING TASKS FOR EACH PHASE OF THE POSTSTROKE JOURNEY

Phase	Survivor Task	Nursing Task
Agonizing	Survival	Protection and physical care
Fantasizing	Ego protection	Reality orientation and emotional support
Realizing	Facing reality	Emotional and psychosocial support
Blending	Adaptation	Teaching
Framing	Reflection	Listening; providing reason for the stroke
Owning	Moving on	Enhancing inner and community resources

Source: Easton, K. L. (2001). *The poststroke journey: From agonizing to owning.* Doctoral dissertation. Wayne State University. Detroit, MI: Author.

Figure 11-6 The Mauk model of poststroke recovery.



Conversely, nurses chose topics such as understanding the disease process, preventing pressure ulcers, demonstrating safe transfer technique, preventing aspiration, and dealing with communication and social interaction problems as being more important. Both results demonstrate a need for teaching that goes beyond what is taught in the traditional hospital setting. Pierce et al. (2004) also found that using an Internet-based support group for rural caregivers produced positive responses and suggested common problems that caregivers face. These include such things as changing roles, problem solving, feeling connected with the family and survivor, using spirituality to cope, and balancing feelings of success in adapting with losses that have occurred.

Some stroke survivors will have **dysphagia** and may return home on a feeding tube, so teaching about nutritional requirements, tube management, and administering medications via the tube will be important. Many survivors will continue to benefit from outpatient therapies in occupational therapy, physical therapy, and/or speech therapy. Some will need referrals to vocational counseling if they wish to return to work. Others may need to follow up with an orthotist for splints or other orthotic devices.

Outcomes for geriatric stroke survivors are enhanced by intensive rehabilitation programs, whether offered in rehabilitation units or in skilled nursing facilities (Jett, Warren, & Wirtalla, 2005). **Table 11-14** presents general approaches to care of stroke suvivors. Generally, advanced age is considered to be a negative factor in recovery from stroke, but factors such as motivation and hope must also be considered in the rehabilitation process. In addition, much of the research literature regarding functional level of recovery after stroke suggests that return of function peaked and did not significantly progress much after the 3–6 month mark poststroke. Easton's (Mauk) research (1999, 2001) as well as other emerging research suggests that survivors can and do continue to make improvements in daily function even years after their strokes. Much of this improvement may be in the area of **instrumental activities of daily**

Table 11-13 COMMON PROBLEMS RELATED TO STROKE

Nursing Diagnoses

- Alteration in tissue perfusion: cerebral
- Alteration in tissue perfusion: peripheral
- Impaired swallowing
- Ineffective airway clearance
- Impaired gas exchange
- Alteration in nutrition: less than body requirements
- Alteration in bowel elimination (constipation, diarrhea)
- Alteration in urinary elimination (incontinence, retention)
- Impaired physical mobility
- Unilateral neglect
- Altered sensory perception
- Self-care deficits (related to toileting, dressing, eating, bathing)
- Impaired communication
- Activity intolerance
- Decreased endurance
- High risk for impaired skin integrity
- High risk for injury
- Altered role performance
- Spiritual distress
- Hopelessness
- Powerlessness
- Pain
- Self-esteem disturbance
- Social isolation
- Sleep pattern disturbance
- Impaired home maintenance management
- Discharge planning needs
- Knowledge deficit
- Fear/anxiety
- Grieving

Common Medical Complications After Stroke

- Pressure ulcers
- Shoulder subluxation
- Shoulder pain
- Dysphagia
- Bowel and bladder dysfunction
- Deep vein thrombosis
- Spasticity
- Depression

Source: From Easton, 1999, p. 196; used with permission of author.

living (IADLS), or home activities that the survivor wished to resume after the stroke. However, new research out of the Cincinnati College of Medicine in Ohio suggests that even mental practice of upper arm mobility may have a significant and positive impact on the stroke survivor's ability to use the affected upper limb (Page, Levine, & Leonard, 2005).

In summary, stroke is a condition that affects millions of Americans and can lead to significant chronic functional limitations and decreased quality of life. It is hopeful for survivors, however, that stroke is not a degenerative or chronic disease. Improvements can be seen after many years in areas that enhance quality of life for survivors and their families. Nurses should continue to follow research trends related to treatment of acute stroke and to educate survivors and their families about the recovery process.

Peripheral Artery Disease (PAD)

Peripheral artery disease (PAD), the most common type of **peripheral vascular disease (PVD)**, affects 8–12 million Americans, 12%–20% of those over the age of 65. The risk factors for PAD are the same as those for CHD,

Table 11-14 General Approaches to Traditional Nursing of the Stroke Survivor

When working with the patient, encourage use of the affected side to reduce neglect.
When the person is alone, place items (such as the call light, tissues, and other personal items) on the unaffected side to promote self-care and safety and to avoid isolation.
Use a variety of teaching modalities during educational sessions to promote learning.
Minimize distractions during educational sessions. Keep these teaching items short and relevant.
Use terms such as "affected/unaffected" side or "weak/strong" side instead of "good/bad."
Use critical pathways or care plans to promote consistency of care, but remember that each survivor is unique and be sure to adapt nursing care accordingly.
Alternate rest and activity.
Build endurance slowly. Remember that a stroke is exhausting to the entire body.
Include the person and family in the plan of care.
Assist the patient and family in setting reasonable goals.
Make early referrals to stroke services or the specialized stroke team.
Connect the family with a stroke support group or club.
Use a discharge follow-up plan.

Right Hemisphere Stroke

- Foster a calm and unhurried care environment.
- Break tasks into simple steps.
- Be especially attentive to safety issues that may arise from poor judgment and lack of safety awareness.
- Protect the patient from injury.
- Be alert for possible deficits that may not be overt.
- Avoid overstimulation.

Left Hemisphere Stroke

- Speak slowly and distinctly.
- Use simple sentences for those with aphasia.
- Encourage all forms of communication.
- Use a variety of communication techniques: gesturing, cues, pointing, writing, communication boards, yes/no questions (if appropriate). Find what is most effective for each person.
- Allow time for the person to respond to questions.
- Provide teaching in a quiet, structured environment.
- Monitor the patient for swallowing difficulties.
- Promote a positive self-image by attention to good grooming, personal hygiene, and positive reinforcement.

Source: Adapted from Easton, 1999, p. 196, with permission of author.

with diabetes and smoking being the greatest risk factors (AHA, 2005b). According to the American Heart Association, only 25% of those older adults with PAD get treatment.

The most common symptoms of PAD are leg cramps that worsen when climbing stairs or walking, but that dissipate with rest. The majority of persons with PAD have no symptoms

(AHA, 2005b). PAD is a predictor of CHD and makes a person more at risk for heart attack and stroke. Left untreated, PAD may eventually lead to impaired function and decreased quality of life, even when no leg symptoms are present. In the most serious cases, PAD can lead to gangrene and amputation of a lower extremity. Most cases of PAD can be managed with lifestyle modifications such as those discussed previously for heart-healthy living. Nurses should also encourage patients with PAD to discuss their symptoms with both their health care provider and a physical therapist, as some patients find symptom relief through a combination of medical and therapy treatments.

Respiratory Problems

Pneumonia

Pneumonia is a leading cause of death among the elderly. Many statistics related to the number of cases of pneumonia are outdated, but in 1996 there were about 4.8 million cases reported, and over 63,000 deaths in the United States attributed to pneumonia in 2000 (American Lung Association, 2003). The majority of these cases occur in those age 65 and over, with older adults having 5–10 times the risk of death from pneumonia than younger adults (Kennedy-Malone, Fletcher, & Plank, 2000).

Pneumonia is an inflammation or infection in the lungs that can be caused by a variety of factors including bacteria, viruses, and aspiration. The elderly are considered at particularly high risk for pneumonia, and even more so if they suffer from chronic obstructive pulmonary disease (COPD), CHF, or any immune-suppressing diseases such as AIDS. The incidence of community-acquired pneumonia among those age 71–85 is 50/1000 per year (Loeb, 2002).

Diagnosis is made through chest x-ray, complete blood count, and/or sputum culture to determine the type and causal agents (if bacterial). A thorough history and physical should also be obtained. Crackles may be heard in the lungs through auscultation, and chest pain with shortness of breath are common complaints.

Cases of viral pneumonia account for about half of all types and tend to be less severe than the bacterial kind. Symptoms of viral pneumonia include fever, nonproductive hacking cough, muscle pain, weakness, and shortness of breath. The onset of bacterial pneumonia can be sudden or gradual, but older adults may not present with the typical symptoms of chills, chest pain, sweating, productive cough, or dyspnea. Confusion may be an additional sign in the elderly.

Bacterial pneumonia can often be treated successfully when detected early, and viral pneumonia generally heals on its own (antibiotics are not effective if pneumonia is caused by a virus), though older adults may experience a greater risk of complications than younger adults. Oral antibiotics will significantly help most patients with bacterial pneumonia, and even though many older persons may require hospitalizations, intravenous (IV) antibiotics have not been shown to be necessarily more effective than oral types, with IV treatment resulting in longer hospital stays (Loeb, 2002).

Aspiration pneumonia is caused by inhalation of a foreign material such as fluids or food into the lungs. This occurs more often in persons with impaired swallowing (see Chapter 12 for a discussion on dysphagia) and those who have esophageal reflux disease or who are unconscious. One particular danger to which nurses should be alert is those older adults receiving tube feedings. Care must be taken to avoid having the person in a laying position during and

immediately after tube feeding because aspiration can occur. Having the head of the bed elevated or, even better, the person in a sitting position when eating or receiving enteral nutrition helps to avoid the potential complication of pneumonia related to aspiration.

When recovering from pneumonia, the older adult should be encouraged to get plenty of rest and take adequate fluids to help loosen secretions. Tylenol or aspirin (if not contraindicated by other conditions) can be taken to manage fever as well as aches and pains. Exposure to others with contagious respiratory conditions should be avoided. Respiratory complications are often what lead to death in the elderly, so older adults should be cautioned to report any changes in respiratory status such as increased shortness of breath, high fever, or any other symptoms that do not improve.

Prevention of pneumonia is always best. Adults over the age of 65 are advised to get a pneumonia vaccine, though its effectiveness may be somewhat diminished in higher risk groups than in healthy younger adults (American Lung Association, 2003). This vaccine is generally given one time, though sometimes a revaccination is recommended after about 6 years for older adults with higher risk. A yearly flu vaccine is also recommended for older adults, because pneumonia is a common complication of influenza in this age group. Medicare will cover these vaccines for older persons, so cost should not be a prohibiting factor in prevention.

Chronic Obstructive Pulmonary Disease (COPD)

COPD refers to a group of diseases resulting from obstructed airflow. The most common of these diseases in older adults are emphysema and chronic bronchitis, often occurring together with the preferred label of COPD.

COPD is the fourth leading cause of death in the United States, accounting for about 120,000 deaths in 2002. It is estimated that nearly 24 million U.S. adults have some type of impaired lung function. Slightly more females than males are affected, with female smokers having a 13 times greater chance of death from COPD than nonsmoking females (American Lung Association, 2004).

The major risk factor for COPD is smoking, causing 80%–90% of COPD deaths. Other risk factors appear in **Table 11-15**. Alpha-1-antitrypsin deficiency is a rare cause of COPD, but can be ruled out through blood tests. "COPD is almost 100% preventable by avoidance of smoking" (Kennedy-Malone, Fletcher, & Plank, 2000, p. 201).

Persons with COPD often experience a decrease in quality of life as the disease progresses. Shortness of breath so characteristic of these diseases impairs the ability to work and do usual activities. According to a recent survey by the American Lung Association, "half of all COPD patients (51%) say their condition limits their ability to work . . ." and ". . . limits them in normal physical exertion (70%), house-

Table 11-15 Risk Factors for COPD

Smoking
Air pollution
Second-hand smoke
Heredity
History of respiratory infections
Industrial pollutants
Environmental pollutants
Excessive alcohol consumption
Genetic component (alpha-1-antitrypsin deficiency)

hold chores (56%), social activities (53%), sleeping (50%) and family activities (46%)" (2004, pg. 3).

Chronic Bronchitis

Chronic bronchitis is a common COPD among older adults. It results from recurrent inflammation and mucus production in the bronchial tubes. Repeated infections produce blockage from mucus and eventual scarring that restricts airflow. The American Lung Association (2004) stated that about 9.1 million Americans had been diagnosed with chronic bronchitis as of 2002. Females are twice as likely as males to have this problem.

The signs and symptoms of chronic bronchitis include increased mucus production, shortness of breath, wheezing, decreased breath sounds, and chronic productive cough. Chronic bronchitis can lead to emphysema.

Emphysema

Emphysema results when the alveoli in the lungs are irreversibly destroyed. As the lungs lose elasticity, air becomes trapped in the alveolar sacs, resulting in carbon dioxide retention and impaired gas exchange. More males than females are affected with emphysema, and most (91%) of the 3.1 million Americans with this disease are over the age of 45 (American Lung Association, 2004). Signs and symptoms of emphysema include shortness of breath, decreased exercise tolerance, and cough. Diagnosis is made through pulmonary function and other tests, and a thorough history and physical.

Treatment for COPDs

Although there are no easy cures for COPD, there are several measures that older adults can take to improve their quality of life by controlling symptoms and minimizing complications. These include lifestyle modifications, medications, respiratory therapy, and pulmonary rehabilitation (see **Table 11-16**). Oxygen therapy is usually required as the disease progresses.

Medications are used to help control symptoms, but they do not change the downward trajectory of COPD that occurs over time as lung function worsens. Typical medications given regularly include bronchodilators through oral or inhaled routes. Antibiotics may be given to fight infections and systemic steroids for acute exacerbations.

In extreme cases, lung transplantation or lung volume reduction surgery may be indicated. Older persons with severely impaired lung function related to emphysema may be at higher risk of death from these procedures and have poorer outcomes.

Nurses working with older adults with COPD will find it challenging to assist them with a home maintenance program that addresses their unique needs with this chronic disease. Teaching should involve the patient and family and should plan for the long term. Reducing factors that contribute to symptoms, use of medications, alternating rest and activity, energy conservation, stress management, relaxation, and the role of supplemental oxygen should all be addressed. Many older adults with COPD find it helpful to join a support group with those who are living with similar problems.

Tuberculosis (TB)

TB, or mycobacterium tuberculosis, is an infection that can attack any part of the body, but particularly targets the lungs. TB is spread through the air by coughing, sneezing, laughing, or other activities in which particles may become airborne.

According to the American Lung Association, the number of new cases of TB in the United

Table 11-16 Strategies for Symptom Management for Older Adults with COPD

Do not smoke.
Avoid second-hand smoke.
Avoid air pollutants and other lung irritants.
Exercise regularly as tolerated or prescribed.
Maintain proper nutrition.
Maintain adequate hydration—especially water intake.
Take medications as ordered: bronchodilators (antibiotics and steroids for exacerbations).
Use energy conservation techniques.
Alternate activities and rest.
Learn and regularly use breathing exercises.
Learn stress management and relaxation techniques.
Recognize the role of supplemental oxygen.
Receive yearly pneumonia and influenza vaccines to avoid serious infections.
Investigate pulmonary rehabilitation programs.
Join a support group for those with breathing problems and their families.
Explore any possible surgical options with the physician.

States has steadily decreased over the past 10 years. In 2003, there were 14,874 new cases in the United States. TB is seen more often in (in descending order) Asian Americans, Pacific Islanders, African Americans, American Indians, and Hispanics than whites. The rate of TB cases among those from other countries is eight times greater than for those born in the United States (American Lung Association, 2005). The AIDS epidemic has contributed to the spread of TB, particularly in less developed countries, due to the suppression of the immune system associated with those who are infected with HIV. Nursing home residents are considered an at-risk group due to the typically higher rates found in this population. General guidelines from the Advisory Committee for Elimination of Tuberculosis (CDC, 1990) set concrete guidelines for prevention and management of TB in nursing homes to decrease the spread among this institutionalized and vulnerable population. Thus, older adults who may be discharged from acute care facilities to a nursing home will generally undergo TB skin testing prior to discharge.

Screening for TB is simple and can be done at the local health department, clinic, or doctor's office. A Mantoux test is an intradermal injection that is read for results in 48–72 hours after administration. A result of 11 mm or greater of induration (not redness, but swelling) is considered a positive result. It is recommended that older adults undergo a two-step screening wherein the test is given again, because there are many false results in the elderly. A positive TB skin test should be followed up with a chest x-ray to rule out active disease.

It must be noted that persons who received a vaccine for TB may have a positive reaction. A TB vaccine is commonly given in many countries outside the United States.

A person can be infected with TB and have no symptoms. This means they may have a positive skin test, but cannot spread the disease. Such a person can develop TB later if left untreated. Those with active TB can spread the disease to others and should be treated by a physician. The signs and symptoms of TB appear in **Table 11-17**.

For older adults born in the United States, a positive skin test may prompt the physician to initiate preventative treatment. The medication isoniazid (INH) is generally given to kill the TB bacteria. Treatment with INH often lasts at least 6 months. Few adults have side effects from the medication, but these include nausea, vomiting, jaundice, fever, abdominal pain, and decreased appetite. Patients taking INH should be cautioned not to drink alcohol while on the medication.

Patients with active TB can be cured, but the medication regimen is complex, with several different drugs taken in combination. Caution should be taken to avoid spread of the disease. This generally means isolation for patients in the hospital with active TB. In 1998, the FDA approved a new medication, rifapentine (Priftin), to be used with other drugs for TB. Medications should be strictly taken for the entire period of time (many months) to kill all of the bacteria. Older adults may need assistance with keeping track of these medications. The use of a medication box set up by another competent and informed family member to assure compliance with the medication regimen may be helpful, because it can be overwhelming for some persons. Adequate rest, nutrition, and hydration as well as breathing exercises may help with combating the effects of TB.

Table 11-17 SIGNS AND SYMPTOMS OF TUBERCULOSIS (TB)

A severe cough that lasts more than 2 weeks
Chest pain
Bloody sputum
Weakness
Fatigue
Weight loss
*Chills
*Fever
*Night sweats

**May not be present in the elderly*
Source: CDC, 1999.

Gastrointestinal Disorders

Gastrointestinal problems are among the most frequent complaints in older adults. Several of the more common disorders will be discussed here, including gastroesophageal reflux, peptic ulcer, diverticulitis, constipation, and several types of cancers.

Gastroesophageal Reflux Disease (GERD)

Gastroesophageal reflux disease (GERD) is thought to occur in 5%–7% of the general population, affecting men, women, and children. It results when acid or other stomach contents back up into the esophagus. Many children outgrow this problem by the age of about 1 year, but for older adults, GERD can be a chronic disorder that affects quality of life.

GERD may be related to several factors including decreased lower esophageal sphincter (LES) tone and increased pressure in the stomach or abdomen. Decreased peristalsis and de-

layed emptying of the stomach may also play a role. GERD causes esophageal irritation and many of the common symptoms associated with this disorder.

Factors related to GERD include pregnancy, obesity, and activities that increase intra-abdominal pressure such as wearing tight clothing, bending over, or heavy lifting (MedlinePlus, 2005).

The most common symptom of GERD is heartburn. In patients with GERD this may occur daily to weekly. Chest pain, difficulty swallowing, a hoarse voice, coughing, and respiratory problems such as asthma or wheezing may also result (Edwards, 2002). It is important for older adults to have proper diagnosis and treatment, because continued reflux can result in esophagitis, and over time abnormal cells may develop (Barrett's esophagus) that can increase the risk for cancer of the esophagus.

Diagnosis is made through a history and physical. Many cases of GERD can be treated with lifestyle modifications and medication. Persistent symptoms of GERD should be referred to an internist or gastroenterologist. This is particularly true of older adults, who may not present with typical symptoms, or present with vague symptoms that might be attributed to other causes. The physician may wish to do a series of tests, one of the most reliable being examining the esophagus and stomach through a fiberoptic scope while the person is under conscious sedation. This allows the doctor to visualize the entire area, view damage, and take biopsies if needed. A common cause of GERD is ***Helicobacter pylori (H. Pylori)***, and this can be diagnosed through biopsy. GERD can be treated with a combination of medications that includes antibiotics and drugs to inhibit gastric secretions.

Treatment involves lifestyle modifications aimed at decreasing causal factors. Patients should be instructed to avoid offending foods such as caffeine, chocolate, nicotine, alcohol, and peppermint. These substances decrease the LES tone and allow the sphincter to become floppy, letting acid creep up into the esophagus. Certain medications may have the same affect, particularly anticholinergics, some hormones, calcium channel blockers, and theophylline. The older person's medication list should be carefully reviewed and offending medications modified. Additional lifestyle modifications include avoiding spicy and tomato-based foods, acidic products, carbonated beverages, and stress that can trigger increased acid production. Patients should be instructed to avoid eating or drinking 3–4 hours prior to bedtime and to elevate the entire head of the bed on 6–8 inch blocks. Some persons feel better sleeping in a recliner chair with the head elevated during flare-ups of heartburn

Box 11-3 Resources for Those with GERD

American College of Gastroenterology (ACG)
4900-B South 31st Street
Arlington, VA 22206-1656
Phone: 703-820-7400
www.acg.gi.org

American Gastroenterological Association (AGA)
National Office
4930 Del Ray Avenue
Bethesda, MD 20814
Phone: 301-654-2055
www.gastro.org

symptoms. Additionally, more frequent but smaller meals will help minimize the pressure in the stomach and should decrease reflux.

Medications play an important role in the treatment of GERD. Antacids are usually used in conjunction with **histamine 2 (H2) blockers** such as Tagamet, Zantac, Pepcid AC, and Axid for mild GERD. If those are ineffective in controlling symptoms, the **proton pump inhibitors (PPIs)** are thought to be drugs of choice. These include the popularly advertised medications Nexium, Prevacid, and Protonix.

GERD is a potentially serious condition. Older persons displaying symptoms should be thoroughly evaluated and aggressively treated. The key nursing interventions center around teaching lifestyle modifications and proper use of medications. Most medications used in GERD can have antacids taken with them between meals and before bed to help control heartburn symptoms. Most of the medications for this disorder are also taken in the morning prior to breakfast (on an empty stomach). H2 blockers are sometimes ordered twice per day. PPIs, usually taken once per day but sometimes in a divided dose (morning and evening), should be taken on an empty stomach. With most such medications, the person then must remember to eat one hour after taking the medication in order for it to be most effective. Remember that management of GERD poses significant challenges to the health care team in order to prevent associated complications.

Peptic Ulcer

About 25 million Americans have peptic ulcer disease, especially those age 55–65 (Kennedy-Malone, Fletcher, & Plank, 2000). The incidence increases with age and occurs more often in Hispanics and African Americans than Caucasians. As with many such problems, early symptoms may not be seen in the elderly. An increase in stress, such as occurs with COPDs, can trigger an ulcer as a complication, so many older adults with chronic respiratory problems are prescribed prophylactic medications during hospitalization. Addititionally, the increased use of aspirin and nonsteroidal anti-inflammatory drugs (NSAIDs) has contributed to a higher incidence of peptic ulcer in the general population. These medications contribute to ulcer development by causing a decrease in the lack of protection to the gastrointestinal mucosa.

Risk factors for peptic ulcer disease include smoking, drinking alcohol, caffeine, stress, and *helicobacter pylori* (*H. pylori*) infection. Signs and symptoms of peptic ulcer include continued epigastric pain, particularly after meals; bowel changes; bloating; and eventually anorexia. In older adults, it is essential to distinguish between ulcer pain and cardiac pain, because both may present as "indigestion."

Diagnosis of peptic ulcer is made through a history and physical. The physician must first determine the type of ulcer. Edwards stated that "90–100% of individuals with duodenal ulcers are infected with *H. pylori* and this is as accurate as any diagnostic test." Barium contrast testing is an initial diagnostic tool, followed by endoscope and biopsy if needed, keeping in mind that less invasive and more inexpensive methods of diagnosis should be tried first.

Treatment of ulcers involves antacids and other medication to control acid production, diet, avoidance of risk factors, and combination therapy if *H. pylori* is the cause. Nurses will need to engage in patient education for treatment to have the best outcome. The medication regimen to treat *H. pylori* is challenging for older patients, yet will eradicate the problem in many cases. Nurses should emphasize that *H. pylori* is

considered a toxin to the body, because it can predispose a person to cancer (Edwards, 2002). Stress management may be helpful to some people, and dietary issues such as avoidance of caffeine, alcohol, and milk products while the ulcer is healing is recommended. Patients who smoke should stop, because this is an associated risk factor. Serious complications such as bleeding can result if patients neglect treatment.

Diverticulitis

Diverticulitis is the inflammation or infection of the pouches of the intestinal mucosa. Sixty-five percent of older adults will develop diverticulosis ("pouches of the intestinal mucosa in the weakened muscle wall of the large bowel" [Eliopoulos, 2005, p. 332]) (**Figure 11-7**) by age 85, with some going on to develop diverticulitis (Kennedy-Malone, Fletcher, & Plank, 2000). Most persons developing diverticulitis are elderly men.

Risk factors for diverticulitis include obesity, chronic constipation, and hiatal hernia. A diet low in fiber is also thought to contribute to this problem. Older persons may not present with the typical symptoms of pain in left lower quadrant, nausea, and fever. During bouts of this disorder, the person may experience constipation, diarrhea, and mucous and/or blood in the stools. Certain foods may irritate the condition, especially those with seeds such as berries or pickles that are not easily digested.

Diagnosis is made through barium enema. Nurses should be sure that after this exam is done, the patient is taught to take the prescribed medications to empty the bowel so that the barium does not harden inside and cause constipation and other difficulties.

Treatment is generally with antibiotics, and if hospitalization is necessary, intravenous fluids will be given. The person should be taught to avoid irritating foods. In extreme cases diverticulitis may result in bowel obstruction leading to a colostomy. In certain circumstances of advanced disease, patients may elect to undergo removal of the diseased bowel to prevent emergency surgery for bowel obstruction.

Cancers

According to Edwards (2002), GI cancers account for greater then 25% of all cancer deaths in older adults, making them the number two cause of cancer next to lung disease.

Esophagus

The two most common type of cancers of the esophagus are squamous cell carcinoma and adenocarcinoma. Of the squamous cell type, black males with a history of alcoholism and heavy smoking comprise the group with highest risk and incidence. Adenocarcinoma is being seen more often in white males, particularly resulting from Barrett's epithelium (a complication of GERD, as discussed earlier) (Edwards, 2002).

Early detection of esophageal cancer is key, because prognosis of either type is rather poor. Esophagoscopy is a major diagnostic test. Major symptoms of esophageal cancer include weight loss and trouble swallowing. In older adults, symptoms may not appear until the cancer is advanced and perhaps already metastasized. It responds poorly to radiation and may be inoperable. Nurses should instruct older persons with these symptoms to be checked by a physician. Nurses can help with primary prevention of this type of cancer by being proactive in smoking cessation groups and by encouraging limitation of alcohol intake (a maximum of one drink per day for females, and two for males).

Figure 11-7 Diverticula.

Source: Leonard Crowley, *Introduction to Human Disease* (6th ed.). Sudbury, MA: Jones and Bartlett Publishers, 2005.

Stomach

Stomach cancer is most often seen in older men age 65–74 (Eliopoulous, 2005). There is a greater incidence among Hispanics, African Americans, and Asians/Pacific Islanders than whites. Rates are high among Japanese men living in Japan (American Cancer Society, 2005d). Men have twice the risk of women.

When detected early, there is a good prognosis, but once a tumor has advanced, patients may deteriorate quickly. Early signs may not be present in older persons, but may include epigastric pain, anorexia, nausea, and difficulty with swallowing. Surgery, radiation, and chemotherapy are options for treatment (and often used in combination), but not all of these methods are equally successful with each type of tumor. *H. pylori* infection can be a contributing factor to stomach tumors, and treatment of the bacterial infection may be more effective in cancer treatment than with other unknown causes.

Nurses can help with primary prevention of stomach cancer by educating older adults as to risk factor reduction and early recognition of symptoms. Dietary changes are a significant way to reduce risk. A diet lower in red meats (risk doubles if eating red meat more than 13 times per week) and higher in antioxidants has a protective effect (American Cancer Society, 2005d). Additionally, regular physical exams and reporting suspicious symptoms for early testing can help increase chances of survival. Men, particularly those of the at-risk ethnic groups, should be especially alerted to these factors.

Colorectal

Colorectal cancer is one of the most common yet treatable forms of cancer. The vast majority of this type of cancer is adenocarcinomas arising from polyps. Although most polyps do not become malignant, the risk of cancer increases as polyp size increases (Edwards, 2002). Thus, routine screening for this type of cancer is recommended in middle age and certainly in those with a family history (see Chapter 10 for screening guidelines).

Colorectal cancer is the second leading cause of cancer deaths in both men and women. Hispanics and African Americans are at higher risk than whites. About 145,290 persons will be diagnosed in 2005, with 56,290 deaths resulting from this type of cancer (Cancer Research and Prevention Foundation, 2005). The 5-year survival rate when detected in early stages is greater than 90% (American Cancer Society, 2005a).

Risk factors for colorectal cancer include upper socioeconomic groups, high fat intake, alcohol consumption, cigarette smoking, sedentary lifestyle, and exposure to environmental toxins. Symptoms depend on location of the lesion, but may include rectal bleeding, anemia, fatigue, abdominal cramping, and change in bowel patterns. Diagnosis is made through history and physical as well as diagnostic tests such as hemoccult, barium enema, and endoscopic exams. The flexible sigmoidoscopy is currently thought to be the best test for detecting early problems. Surgery is the best option for treatment of early malignant polyps.

Colorectal cancers are largely preventable, so nurses need to focus interventions on educating the public about this problem. Nurses should teach their patients and clients that adding fruits, vegetables, and fiber to the diet may help protect against this type of cancer. Increasing activity levels while avoiding smoking, obesity, high-fat foods, high-sucrose foods, and excess alcohol are all ways to reduce risk (Cancer Research and Prevention Foundation, 2005; Edwards, 2002).

PANCREAS

Pancreatic cancer is found more often in older adults and is a leading cause of death for this age group. It generally strikes those between 60 and 80 years of age and is more prevalent in men than women (Kennedy-Malone, Fletcher, & Plank, 2000). Cigarette smoking, family history, and diabetes are significant risk factors. In fact, the American Cancer Society estimates that 3 in 10 cases of pancreatic cancer are attributed to smoking (2005c).

Cancer of the pancreas generally progresses rapidly and carries a poor prognosis. Early detection is not always possible due to lack of symptoms. Early symptoms may include nausea, vomiting, anorexia, weight loss, depression, and excessive belching. Jaundice and itching occur with progression of the cancer (Kennedy-Malone, Fletcher, & Plank, 2000).

Treatment is usually palliative, particularly for advanced cancer in the older adult. Surgery is an option in some types/locations of tumors, but given the poor prognosis in the elderly, interventions will focus on comfort measures such as pain control. Narcotic analgesics and antihistamines for itching are standard treatment. Hospice services should be obtained as early as possible when the prognosis is terminal.

Constipation

Constipation is the most common bowel problem in older adults. Bowel function is not a topic generally discussed in most societies. Because of the private nature of elimination activities, older adults may experience difficulties in bowel function and not let the problem be known until it is serious enough to interfere with normal daily functioning. Normal bowel function is considered a bowel movement anywhere from three times per day to three times per week, so patterns vary widely among individuals. In most hospital settings, constipation is considered to be present in a patient when there has been no bowel movement for more than 2 days.

The results of normal aging contribute to this disorder through the slowing of intestinal peristalsis and the decrease in thirst mechanism resulting in less fluid intake. Others causes include dehydration, decreased activity, lack of fiber in the diet, side effects of medications, and neurogenic bowel or other disease. Constipation can lead to fecal impaction and even bowel obstruction in the most severe cases.

Generally, constipation is a manageable problem that is often best remedied by carefully planned nursing interventions. The interventions depend on the cause. There are several factors to be considered (see **Table 11-18**). Factors that cannot be controlled related to bowel function include a family history of disease or presence of neurogenic bowel or other disorder. However, there are many factors that

Table 11-18 FACTORS TO CONSIDER IN BOWEL MANAGEMENT

Uncontrollable Factors	Controllable Factors
Family history	Diet
Presence of neurogenic bowel	Fiber
Existence of prior bowel disease	Fluids
	Timing
	Activity
	Positioning
	Medications

can be modified to assist with prevention of constipation and maintenance of an effective bowel program. These include diet, fiber, fluids, timing, activity, positioning, and medications (Mauk, 2005).

The method of treatment and subsequent prevention of constipation depends on the cause. General principles (**Table 11-19**) are to use all natural means first and start with a clean bowel. That is, if impaction is present, manually remove the stool if possible and administer prescribed medications to cleanse the bowel prior to beginning any bowel program. Bowel management focuses on modification of the controllable factors. First, the person should be encouraged to consume a diet high in fiber. This includes foods such as whole grains, bran cereal, beans, pulpy fruits, and root vegetables. Although popcorn and nuts are high in fiber, they pose a problem for older adults with dysphagia or diverticulitis, so care should be taken when recommending certain foods. Patients should drink plenty of fluids, and water is the best choice. Generally, between 1,500 and 2,000 cc's (or $1^1/_2$–2 liters) per day is a good intake for older adults.

Timing is another important factor in treatment. Persons should take advantage of their usual bowel patterns; that is, if they usually defecate first thing in the morning, then that time should be tried first. If this fails, the person should attempt to move the bowels shortly after breakfast, because this is when the gastrocolic reflex is strongest. Positioning sitting up, not on the bedpan or in bed, is best to allow gravity to assist and to promote a feeling of normalcy. Even those who cannot ambulate to the toilet can use a bedside commode. Increasing activity will help to stimulate peristalsis and decrease constipation. All of these methods are employed in a bowel maintenance program.

Lastly, medications may play a role for those patients with constipation that is due to disease or disorders such as stroke, brain injury, or spinal cord injury. Oral medications fall into many categories including bulk formers (Fibermed, Metamucil), stool softeners (Docusate/Colace), and peristaltic stimulators (Pericolace or Senna), to name a few. Oral medications such as Colace are the most common. Nurses must instruct patients to drink at least 1,000 cc (1 liter) of water per day for Colace to be effective. Ironically,

Table 11-19 Principles of Bowel Programs to Prevent Constipation

- Start with a clean bowel (administer needed medications or enemas to cleanse the bowel prior to initiating a program or protocol).
- Try all natural means first: fiber, fluids, activity, timing, positioning.
- Be sure the person is taking adequate fiber and fluids before adding medications.
- Change only one item at a time in the program. Allow several days to pass before evaluating the effectiveness of the change. If needed, add another intervention.
- Stool softeners are given for hardened stool and the person must drink at least a liter of fluid per day for them to be effective.
- Peristaltic stimulators are useful when the person is unable to move the stool down into the rectum.
- Use the least caustic type of suppository that is effective for the older person.
- Avoid the use of bedpans—have the person sit upright on the toilet or commode.
- Avoid the regular use of enemas.

for some persons, increasing fluids to this level may preclude the need for medication to treat constipation.

Rectal medications include several types of suppositories: glycerin suppositories (mild), dulcolax (Bisacodyl) suppositories (strong but effective, and can cause cramping), CEO-2 suppositories (work by releasing gas and distending the rectum), and combinations such as the Therevac mini-enema (melted glycerin, Colace, and soap in a plastic dispenser). The Therevac mini-enema may produce results more quickly because the medication is already liquefied and more readily absorbed. One drawback of Therevac is that the tip of the plastic dispenser that is inserted into the rectum can cause small tears without adequate care and lubricant.

Important to remember in administering suppositories is that the typical suppository works by acting as an irritant to the rectal mucosa, so it must be placed next to the rectal wall in order to work. Placing suppositories into impacted stool will be ineffective. The person should be laid on the left side for suppository insertion to position the bowel in the most correct way for effectiveness. Products such as the Thereva mini-enema are quite effective in older adults and take less time for results. Waxy suppositories may take 15–60 minutes to melt and produce results.

Digital stimulation is used in some instances, particularly in those with spinal cord injury, in combination with suppository therapy as a daily bowel program. However, as a rule, digital stimulation should be avoided in the elderly due to the potential for vaso-vagal stimulation that can cause heart and blood pressure changes. Other methods, as discussed above, are generally more effective and safer in older adults, except for those with certain types of spinal injury.

Enemas should also be avoided as part of a routine bowel program. Enema use should be restricted to cleansing of the bowel for presurgical preparation or for impaction. In older adults, making enemas part of the regular bowel program may result in a distended, lazy bowel and dependence on enemas for evacuation. Likewise, over-the-counter laxatives should be used only when needed, and older persons should be educated on their appropriate use.

Finally, special bowel programs may be needed for those with neurogenic bowel function. Patients with problems in the brain and/or spinal cord, such as those with stroke, dementia, Parkinson's disease (PD), multiple sclerosis, traumatic brain injury, or spinal cord injury, will need the expertise of rehabilitation nurses to develop a comprehensive and realistic plan for bowel management and the prevention of constipation.

Genitourinary Problems

The elderly can have several major problems related to reproductive and urinary systems. Reznicek stated that "the three most common and vexing clinical urologic problems in the elderly are prostate cancer and benign outlet obstruction in men and urinary incontinence in women" (2000, p. 1). This section will discuss these common problems including urinary incontinence, bladder cancer, vaginitis, breast and cervical cancer, benign prostatic hyperplasia, prostate cancer, and erectile dysfunction.

Urinary Incontinence

Incontinence of the bladder (loss of urine) is a common problem among older adults, affecting 30% of community-dwelling elderly, over half of those living in nursing homes, and at least 11% of elders in acute care hospitals (Bradway

& Yetman, 2002; Eliopoulos, 2005). It is a symptom rather than a disease in itself. Women are particularly affected by urinary incontinence, and because many find it embarrassing to discuss, the problem often goes untreated. Older women may not even consider themselves incontinent unless they have an "accident" in public. If they are able to hide or manage the problem themselves with the use of peri pads or other undergarments, they may not seek help. Incontinence should never be considered a normal part of aging, because it is highly treatable in most cases and is not an inevitable part of old age. This chapter presents an introduction to the problem of urinary incontinence. Please refer to Chapter 12 for a more in-depth discussion.

Understanding bladder anatomy and physiology may help with understanding incontinence. The bladder is made of many layers of smooth muscle that create a holding space for urine. The kidneys filter waste from the body and send the remaining fluid through the ureters into the bladder. The bladder has stretch receptors that signal the brain when it is full and needs to be emptied. In a person without neurological deficits, inhibitory fibers allow the person to hold the urine until he or she reaches a bathroom. When it is time to void, the **detrusor** or bladder muscle contracts and the sphincters relax, allowing the urine to flow out. In persons with neurological problems such as spinal cord injury, head injury, or advanced Alzheimer's, messages to inhibit expulsion of urine may not get back to the brain, resulting in incontinence or urinary retention.

Assessment

Assessment of incontinence involves a thorough history and physical. Ask about frequency of voiding, pain, feelings of emptying completely, and color and odor of urine. A urine culture and sensitivity should be ordered to rule out infection. A journal may be kept by the person to record incidents of incontinence, oral fluid intake, precipitating activities, and other information that would be helpful to a health care professional in determining the cause or type of incontinence.

Managing Incontinence in the Elderly

Prior to managing incontinence, the cause or type should be determined based on signs, symptoms, history and physical, and lab results. Be sure to check for the presence of a urinary tract infection (UTI), because this is sometimes a causal factor in older adults (**Case Study 11-3**). For most types of incontinence, timed, scheduled, or prompted voiding helps to decrease incontinent episodes, as do **Kegel exercises** that help strengthen pelvic floor muscles. Patients should also be taught to balance intake and output and may need to limit fluids at night if nocturia is a factor.

Types of Incontinence

There are several common types of incontinence. These include **stress, urge, overflow, reflex, functional,** and **mixed**. Determining the type of incontinence will point the way to appropriate management.

Stress Incontinence. Stress incontinence generally results from multiple pregnancies, obesity, or surgery. It is triggered by laughing, sneezing, coughing, or straining of abdominal muscles to the point that the intra-abdominal pressure is greater than the ability of the sphincters to resist. Small amounts of urine are lost in occasional or frequent episodes. Treatment includes Kegel exercises with or without biofeedback. The benefit of biofeedback is that the patient can see

Case Study 11-3

The clinical nurse specialist is running a clinic for women with incontinence. She specializes in helping older women with stress incontinence regain bladder control and decrease the incidence of wetting episodes. A student nurse is doing a clinical rotation in the clinic and has many questions.

Questions:

1. What should the nurse in charge teach the student nurse about the types of incontinence?
2. What treatments would be expected at this type of clinic?
3. Are there resources where a student nurse could find out more information about incontinence and its treatment?
4. Do you think that such a nurse-managed clinic could show good client outcomes for a problem such as this?

through electronic means the effect of contracting the appropriate muscles. Some older adults may find biofeedback distasteful and can learn the same principles through proper instruction from the nurse.

Urge Incontinence. This type of incontinence is related to birth defects, spine or nerve damage, immobility, prostate problems, overactive bladder, or cancer. Some older persons experience this type as a result of advancing age, though it should not be considered a normal part of aging. The person experiences a sudden and unexpected need to void with moderate to large amounts of urine lost. Kegel exercises may be quite effective for this type of incontinence. To be most effective, the person should first master the ability to tighten the muscles used in Kegel exercises. Then, when the urge to void hits, the person should implement the Kegel maneuver while en route to the bathroom facilities. Urge incontinence may also be helped by combining the pelvic floor strengthening exercises with timed voiding, lengthening the amount of time between voidings until more normal voiding patterns are achieved. Recent research has shown that most incontinence among the elderly is from "overactive bladder" (OAB). If this is true, then in many instances bladder retraining and medications should make a significant difference.

Overflow Incontinence. This type of incontinence is seen mainly in those with birth defects, spinal cord injury or nerve damage, multiple sclerosis, or loss of bladder muscle tone; postsurgery; or as a side effect of medications. It results from small to moderate amounts of urine spilling over from a full bladder and usually does not result in complete emptying. Persons with this type of bladder problem may have frequent urinary tract infections from urine

sitting in the bladder in amounts where bacteria can grow. They are generally unable, because of a congenital defect or neurogenic problem, to empty urine voluntarily.

Treatment for overflow incontinence is to treat the cause when possible. For example, if incontinence is the result of a side effect of medication, that medication may be discontinued or changed. However, because it is often not possible to change the cause, as in the case of a preexisting disease, treatment may take several forms. The bladder may be scanned to check postvoid residual urine. If a bladder scan machine is unavailable, the physician may order a PVR (postvoid residual) catheterization. This is done by performing a straight catheterization, and tells how much urine is left in the bladder after the person voids. When overflow incontinence is present, these amounts are generally significant. A general rule is that no more than 100–150 cc should remain in the bladder after voiding, or the person is not completely emptying. Intermittent catheterization is the best treatment for emptying this type of bladder. Persons will generally not be able to voluntarily void, and the bladder must be emptied by some means on a regular basis. Intermittent catheterization is the preferred means, because it results in less infection than indwelling foley catheters. In the event that the older person is unable to manage intermittent catheterization and has no caregiver to assist, an indwelling foley catheter, or suprapubic catheter, may be necessary.

Reflex Incontinence. Generally related to spinal cord injury, developmental disability, congenital defect, dementia, or other brain injury, reflex incontinence gives no warning prior to the incontinent episode. Often, a large amount of urine is lost and emptying may be complete. Treatment for this type of problem is similar to overflow incontinence in that the person usually cannot stop and start urine flow on his or her own. Intermittent catheterization is usually necessary to avoid incontinence. Timed or scheduled voiding may help, but if the person is unable to start the flow of urine, this may be ineffective. Similar to overflow incontinence, an indwelling foley catheter may be needed if episodes are continual and timed voiding is ineffective.

Functional Incontinence. This type of incontinence is related to the inability to get to bathroom facilities due to functional reasons such as obesity, clutter that blocks the path to facilities, or immobility. When associated with urge incontinence, as is often the case, it is called mixed incontinence. Treatment involves modifying the environment or modifying the lifestyle. Clutter should be removed, and a commode may need to be placed nearer to the bedside at night to avoid nocturia incontinence at night.

Bladder Cancer

According to the National Cancer Institute (NCI), 38,000 men and 15,000 women are diagnosed with bladder cancer each year in the United States. "It is the fourth most common type of cancer in men and the eighth most common in women" (NCI, 2005). The incidence increases with age, with an average age at diagnosis of 68 or 69 (MayoClinic, 2004). Men are three times as likely to get cancer of the bladder as women (American Foundation for Urologic Disease, 2005). Risk factors include chronic bladder irritation and cigarette smoking, the latter contributing to over half of cases (**Case Study 11-4**).

The classic symptom of bladder cancer is painless hematuria, which may be a reason that older adults sometimes do not seek treatment right away. They may attribute the bleeding to

Box 11-4 Resources for Those with Common Cancers

American Cancer Society (Breast Cancer)
I Can Cope (community support groups)
www.cancer.org
1-800-ACS-2345

National Breast Cancer Foundation
www.nationalbreastcancer.org

American Cancer Society (Bladder Cancer)
1599 Clifton Road, N.E.
Atlanta, GA 30329
800-ACS-2345
www.cancer.org

Bladder Health Council
c/o American Foundation for Urologic Disease
1000 Corporate Boulevard, Suite 410
Linthicum, MD 21090
800-828-7866

American Urological Association
Online patient information resource
www.urologyhealth.org

hemorrhoids or other causes and feel that because there is no pain, it could not be serious. Diagnosis may involve several tests including an intravenous pyelogram (IVP), urinalysis, and cystoscopy (in which the physician visualizes the bladder structures through a flexible fiberoptic scope).

Once diagnosed, treatment depends on the invasiveness of the cancer. A transurethral resection (TUR) may involve burning superficial lesions through a scope. Bladder cancer may be slow to spread, and less invasive treatments may continue for years before the cancer becomes invasive, if ever. Certainly chemotherapy, radiation, and immune (biological) therapy are other treatment options, depending on the extent of the cancer. Biological therapy includes Bacillus Calmette-Guerin (BCG) wash, an immune stimulant that triggers the body to inhibit tumor growth. Treatments are administered directly into the bladder through a catheter for 2 hours once per week for 6 or more weeks (MayoClinic, 2004). However, in 90% of the cases, surgery is involved as a standard treatment (American Cancer Society, 2004).

If the cancer begins to invade the bladder muscle, then removal of the bladder (**cystectomy**) is indicated to prevent metastasis. Additional diagnostic tests will be performed if this is suspected, including CT scan or MRI. Chemotherapy and/or radiation may be used in combination with surgery. When the cancerous bladder is removed, the person will have a **urostomy**, a stoma from which urine drains into a collection bag on the outside of the body, much like a colostomy does. Nursing care includes assessment and care of the stoma, emptying and changing collection bags as needed, and significant education of the patient related to intake/output, ostomy care, appliances, and the like.

Female Reproductive System

Several problems common among older females will be discussed here. These include vaginitis, and cervical and breast cancer.

Vaginitis

Normal aging changes in the female reproductive system (see Chapter 6) make elderly women more at risk for infection. The vaginal canal becomes more fragile with age due to atrophy. Less vaginal lubrication and more alkaline pH due to

Case Study 11-4

Dr. Johnson is a 62-year-old dentist who runs a busy practice in a large suburb of Chicago. He had been a smoker for over 30 years but recently quit. For some time he has noted little spots of blood in his urine, but he did not have pain, so he attributed it to some prostate problems he has had in the past. Dr. Johnson hears a couple of his patients discussing a mutual friend with bladder cancer who has similar symptoms, and this prompts him to visit his family physician for a checkup. After several tests and a cystoscopy, Dr. Johnson is diagnosed with early stage bladder cancer.

Questions:

1. What risk factors did Dr. Johnson have for bladder cancer?
2. What primary sign did he exhibit?
3. Since his cancer was detected early, what treatments might be options in his case?
4. If Dr. Johnson's cancer becomes invasive, what other options are available for treatment?
5. Describe the nursing implications and care if Dr. Johnson needed to have a cystectomy?
6. How would you explain this procedure to his family?

lower estrogen levels put elderly women at increased risk of vaginitis. Symptoms of vaginitis may be similar to UTI or yeast infection, and may include itching and foul-smelling discharge.

Vaginitis is treated with topical estrogen creams or estrogen replacement therapy. Women should be instructed to avoid douching and feminine deodorant sprays or perfumes. Wearing cotton undergarments may also help. A water-soluble lubricant such as K-Y gel should be used during intercourse if vaginal dryness is a problem, because the use of other lubricants such as Vaseline contributes to cases of vaginitis.

Cervical Cancer

Cervical cancer incidence peaks in women age 50 to 60, with women over age 65 accounting for a significant number of new cases and deaths each year. Healthy People 2000 initiatives have helped to raise awareness among health care providers and the general public about the need for screening for cervical cancer. However, even with heightened awareness, studies indicate that older patients are generally treated less aggressively (radiation versus surgery) and have poorer outcomes than younger patients, with some older women refusing treatment altogether (Rissner & Murphy, 2005). Additionally, late-stage cancer diagnoses and subsequent death are more common among women over 65 than among those in younger age groups (Bradley, Given, & Roberts, 2004).

The current American Cancer Society guidelines state that women should have annual Pap

smears until age 30. After age 30, with no history of abnormal smears, women may elect to have the screening done every 2–3 years. Those age 70 and older may choose to stop screening entirely if they have had no abnormal results in the past three smears and no abnormal results within 10 years' time prior to age 70 (Smith, Cokkinides, & Eyre, 2003).

Risk factors include smoking, onset of sexual intercourse prior to age 18, and multiple sexual partners. Screening offers the opportunity of early treatment. A new vaccine is being researched using the human papillomavirus to prevent cervical cancer.

The symptoms of cervical cancer are not usually evident in early stages, but may include vaginal bleeding, generally without pain until later stages. Prognosis is good if detected early. Most early precancerous lesions can be successfully treated with laser or cryotherapy. Traditional treatment for cancer generally includes radiation and/or surgery, depending on the stage of progression.

Breast Cancer

Breast cancer is the second leading cause of death for women. This disease claims more than 40,000 lives per year and affects over 200,000 people annually in the United States (American Cancer Society, 2005b). The incidence of breast cancer in women over age 50 has increased in recent years. Half of all breast cancers are diagnosed in women over the age of 65 (National Breast Cancer Foundation, 2005). Men may also develop breast cancer, though this is much less frequent, and they should not be excluded from education about the disease.

Screening guidelines for older women include mammography, yearly clinical breast exam (CBE), and monthly self breast exam (SBE). As of age 40, women should have mammography yearly until age 75, and then every 2–3 years thereafter.

There are several risk factors for breast cancer, some controllable, some not. These include family history, late menopause, having the first child after age 30, high fat intake, and alcohol consumption. Of course, primary nursing care focuses on those factors that can be modified. Geriatric nurses should be particularly aware of the importance of early detection among those older women who are at higher risk.

Signs and symptoms of breast cancer include a breast mass or lump, breast asymmetry, dimpling of the skin or "orange peel" appearance, and nipple changes (Kennedy-Malone, Fletcher, & Plank, 2000). Mammography and biopsy in addition to lab tests, chest x-ray, and bone scans are indicated for diagnosis (**Case Study 11-5**).

There are various stages of breast cancer. Stage I has a 98% survival rate at 5 years, whereas Stage IV has a 16% survival rate at 5 years (National Breast Cancer Foundation, 2005). Treatment for breast cancer depends on stage, but includes any combination of radiation, chemotherapy, and/or surgery. Depending on the type of tumor, hormone therapy may also be effective.

Nursing care is important at all levels of prevention. Nurses working with older adults should encourage appropriate screening according to recommended guidelines. The elderly should be taught proper technique for self breast exam and encouraged to have regular checkups with their physician. Although controversy exists over the use of mammography, it remains an effective means to detect many cancerous tumors at an earlier stage with minimal risk to the person.

For older women undergoing mastectomy as treatment for breast cancer, nurses may expect a longer time to be needed for recovery. Promotion of the return of full range of motion of the arm on

Case Study 11-5

Mrs. Valdez is a 65-year-old woman who comes to the physician's office after experiencing enlargement of her right breast upon self-exam. The nurse observes during the physician's physical examination that Mrs. Valdez's right breast is twice as large as the left one and has a puckered appearance. The physician tells Mrs. Valdez that she will need to have some tests and a biopsy and then he leaves the room. Mrs. Valdez looks at the nurse and asks "What does he mean? What is wrong with me?"

Questions:

1. What should the nurse explain to Mrs. Valdez at this point? What educational materials might she need?
2. What tests would the nurse expect the physician to order?
3. Are there possible risk factors for breast cancer that Mrs. Valdez might have? If so, what are they?
4. Given the physical observations, what would the nurse expect to see done for this patient?

the operative side is essential. This may require physical therapy in addition to the psychosocial and emotional support involved in rehabilitation.

Male Reproductive System

The most common disorders among older men related to the reproductive system include **benign prostatic hyperplasia (BPH)**, cancer of the prostate, and **erectile dysfunction (ED)** or impotence.

Benign Prostatic Hyperplasia (or Hypertrophy) (BPH)

BPH, also known as prostatism, results from a noncancerous enlargement of the prostate gland that is associated with advanced age. This condition affects 50% of men age 51–60 and up to 90% of men over 80 years (American Urological Association, 2005a). Although the enlargement is benign, it is sometimes associated with prostate cancer, so men with this condition should be carefully monitored.

BPH occurs when the enlarged prostate squeezes the urethra it encompasses and causes related symptoms. The symptoms include a decreased urinary stream, frequency, urgency, nocturia, incomplete emptying, dribbling, a weak urine stream, and urinary incontinence (**Table 11-20**). The urge to void may be so frequent in men with BPH (every 2 hours) that it can interfere with sleep and activities of daily living. Risk factors for BPH include advanced age and family history.

Diagnosis is made using any number or combination of tests and studies including urinalysis, postvoiding residual, **prostate-specific antigen (PSA)**, urodynamic studies, ultrasound, and cystoscopy. Medical treatment generally includes medications and surgery. The two most frequently used types of medications

Table 11-20 SIGNS AND SYMPTOMS OF BPH

- Decreased urinary stream
- Urinary frequency
- Urinary urgency
- Nocturia
- Urinary incontinence
- Incomplete bladder emptying
- Urinary dribbling
- Feelings of urge to void but difficulty starting urine stream
- Decreased quality of life related to symptoms
- Altered sleep patterns related to nocturia

are alpha-blockers and 5-alpha-reductase inhibitors. Alpha-blockers such as doxazosin (Cardura), terazosin (Hytrin BPH), and tamsulosin (Flomax MR) work to relieve symptoms of BPH by relaxing the smooth muscle of the prostate and bladder neck to allow urine to flow more easily. A 5-alpha-reductase inhibitor such as finasteride (Proscar) works differently by shrinking the prostate to promote urine flow, but has sexual side effects such as impotence (American Urological Association, 2005a; Mead, 2005).

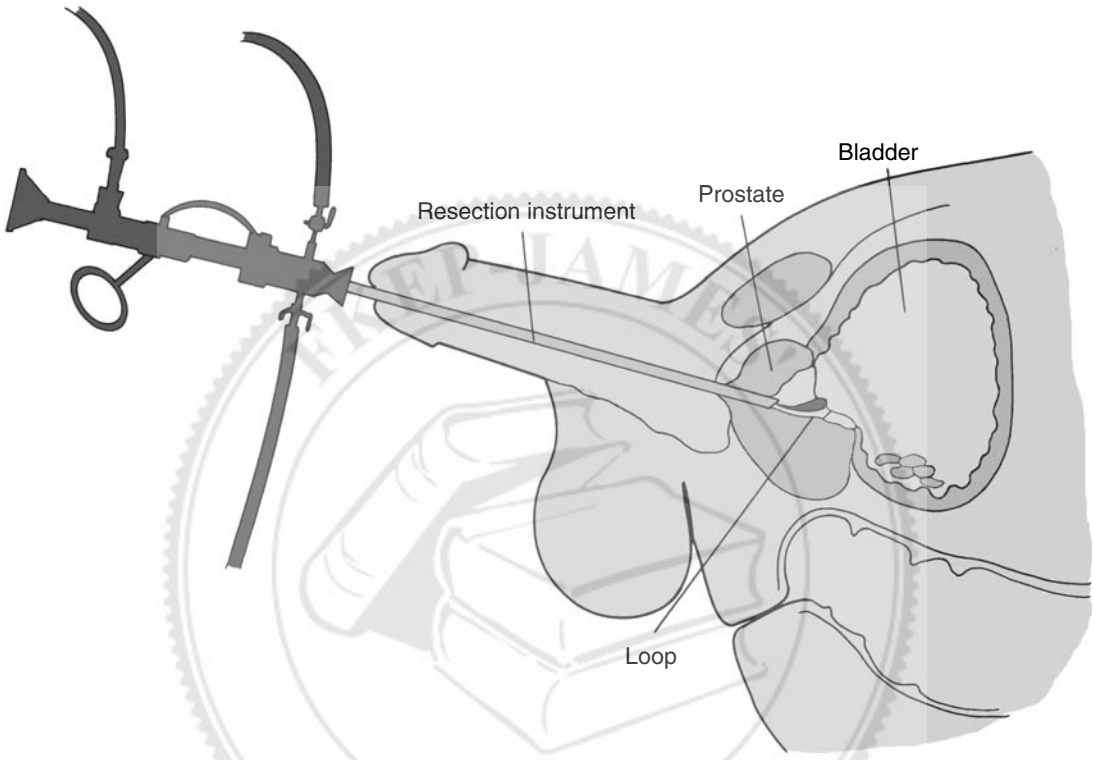
A common surgical intervention for BPH is a **transurethral resection of the prostate (TURP)**. During this procedure, the urologist resects the enlarged prostate gland through a cystoscope (**Figure 11-8**). Older men sometimes call this the "Rotor Rooter" surgery. Nursing care after this procedure is essential to avoid complications related to the heavy bleeding that may occur. The patient will have an indwelling urinary catheter with three ports. Postoperatively, **continuous bladder irrigation (CBI)** must be maintained to prevent dangerous clotting of the blood. The nurse is responsible for assessing the color of the urine draining from the catheter. The urine in the tube should be charted with specific terms such as bright red, brick red, tea colored, amber, yellow, or clear. The number and size of clots draining from the catheter should be described. The goal of the CBI is to flush the bladder, so the nurse must regulate the rate of the fluid to keep the urine yellow or as clear as possible. CBI will continue postoperatively until the bleeding stops. Bleeding complications may result if the CBI is allowed to go dry or the catheter is removed too soon after surgery. In the event that the patient is unable to void after removal of the catheter post-TURP, the catheter may need to be reinserted by doctor's order. If the nurse is unable to reinsert the catheter, the physician may need to be called in to do this. Nurses should be particularly alert to the potential for complications in older men after this procedure.

PROSTATE CANCER

Prostate cancer is the second leading cause of cancer death in U.S. males, with an estimate of over 30,000 deaths predicted for 2005. One in 6 men will have prostate cancer in his lifetime, but mortality (1 in 33) has declined (American Cancer Society, 2005). The incidence of prostate cancer increases with age. Over half of men 70 and older show some histologic evidence, though only a small percentage die from this disease.

Older men with prostate cancer may be asymptomatic, so screening is still recommended. If present, symptoms of prostate cancer may include urinary urgency, nocturia, painful ejaculation, blood in the urine or semen, and pain or stiffness in the back or thighs (Medline Plus, 2005). Risk factors of prostate cancer include advanced age, a diet high in saturated fats, family history, and ethnicity (Afri-

Figure 11-8 TURP.



Source: Leonard Crowley, *Introduction to Human Disease* (6th ed.). Sudbury, MA: Jones and Bartlett Publishers, 2005.

can Americans slightly higher than whites, and low incidence among Asian males; Bradway & Yetman, 2002).

Diagnosis of prostate cancer begins with a digital rectal exam and PSA test. The rectal exam may detect malignancy in the form of a hard, nodular prostate. A PSA of less than 4 ng/ml is considered normal for age 60–69 years, whereas 7 ng/ml may be normal in the 70–79 age group, because PSA rises with age. Sixty percent of men with a PSA above 10 ng/ml have prostate cancer (Bradway & Yetman, 2002; Mead, 2005). Diagnosis can only be confirmed through biopsy, however. Although recently the PSA test has been questioned as a reliable screening test, many urologists believe it is "still the best tool for early diagnosis" (Crawford, 2005, p. 1450). A series of PSA tests is the most effective means of screening, because a rise of 20% over a year (greater than 0.75 ng/ml per year) generally indicates cancer (Mead, 2005).

Treatment depends on the stage of cancer growth, but for more localized cancers generally includes three major options: **radical prostatectomy**, radiation therapy, and surveillance. Surgery is considered the best option when the

cancer is caught early. However, because a radical prostatectomy is major surgery and carries some inherent risks, all options should be considered with the older patient. The major problems after surgery to remove the prostate include urinary incontinence (which is often temporary) and impotence. The skill and experience of the surgeon can decrease the risk of urinary incontinence after surgery to 2%–5% (American Urological Association, 2005b).

New treatments being explored for prostate cancer include the implantation of radioactive seeds and Vitamin E from select plant seeds (Medline Plus, 2005). A holistic approach to care may include dietary changes such as a low fat diet and the addition of Vitamin E, selenium, and soy protein (Bradway & Yetman, 2002).

Nursing care surrounding treatment for prostate cancer will involve helping families to explore the options, linking them to community resources, and providing education related to managing postoperative complications if surgery is indicated. Geriatric nurses should be informed as to the various options available for treatment of impotence that accompanies this type of surgery. Couples should be provided with support group information as well as information on penile implants and other devices that patients may wish to consider after recovery.

Erectile Dysfunction (ED)

Erectile dysfunction, also known as impotence, is defined as the inability to achieve and sustain a sufficient erection for intercourse. ED is prevalent in approximately 70% of men age 70 and over (Reuben, Herr, Pacala, Pollock, Potter, & Semla, 2004). One in every 6 American men is affected by ED (10–20 million). The incidence of ED increases with age, but it is not inevitable and is highly treatable in many cases. The causes of ED may be many, including diabetes, hypertension, multiple sclerosis, spinal cord injury, thyroid disorders, alcoholism, renal failure, hypogonadism, other diseases, medications (**Table 11-21**), and psychological factors.

Treatment options for ED fall into several categories including oral medications, vacuum pump devices, penile implants, and drugs injected into the penis. Sildenafil (Viagra) is an oral medication that is taken 1 hour prior to sexual activity. It is contraindicated in those with heart disease and may result in some cardiovascular-related side effects including headache, flushing, and nasal congestion. Other oral products on the market (Cialis, Levitra) are based on similar principles. A recent complaint about Viagra is the possibility of irreversible visual impairment in some men, but screenings for those at increased risk of this complication (those with certain characteristics in the inner eye being at higher risk) can be done by most physicians or eye doctors.

Vacuum devices have a good acceptance in the elderly population, with a 70%–90% success rate (Reuben et al., 2004). These devices work in various ways to pump or draw blood

Table 11-21 Medications That May Affect Sexual Function

Anticholinergics
Digoxin
Antihypertensives
Sedatives
Hypnotics
Tranquilizers
Antidepressants
Sleeping medications

into the penis and use another mechanism such as a ring around the base of the penis to help sustain the erection for intercourse. Risks from use of this device would include bruising or bleeding (in extreme cases). Nursing instruction to couples on the use of such a device is essential to prevent harm. Other treatments for ED include medications that may be injected directly into the penis to cause temporary erection, and some persons may opt for having surgery to insert a penile implant. Penile implants may be the type that results in permanent erection or a type that may be pumped to cause erection and then released. All options should be explored with persons wishing information on treatment of ED.

Neurological Disorders

There are several neurological disorders common to the elderly, including diseases and conditions that are often secondary to common diseases. Two of the most frequently occurring neurological diseases in the elderly will be discussed here: **Parkinson's disease (PD)** and **Alzheimer's disease (AD)**. Stroke may also be considered a neurological disorder, but was discussed previously in the section on circulation problems. Complications that affect the neurological system as a result of a variety of causes may include seizures, tremor (see discussion on PD), peripheral neuropathy (see discussion on diabetes), and dizziness.

Alzheimer's Disease (AD)

Alzheimer's disease (AD) is the most common type of dementia seen in older adults. Other forms of dementia include vascular dementia, dementia with Lewy bodies, and Parkinson's dementia. Care of the person with AD provides an example of nursing interventions for all persons with dementia. Advanced age is the single most significant risk factor for AD. AD affects about 4.5 million Americans, with a projected 11.3–16 million American diagnosed with AD by 2050 (Alzheimer's Association, 2005). Those affected with AD may live from 3–20 years or more after diagnosis, making the lifespan with this disease highly variable. Seventy percent of people with AD live at home until the latest stages, being cared for mainly by family members (Alzheimer's Association, 2005). These statistics reveal that AD has and will continue to have a great impact on our society.

AD is characterized by progressive memory loss. It is a terminal disease that over its course will eventually leave a person completely dependent upon others for care. The disease is gradual, with an average lifespan of 8 years (Cotter, 2002). The underlying pathology, with an unknown etiology, behind the disease is a growth of plaques and fibrillary tangles that interfere with normal cell growth and the ability of the brain to function. Absolutely definitive diagnosis is still through autopsy, although clinical guidelines make diagnosis easier than decades ago when less was known about the disease.

The clinical course of AD is divided into several stages, depending on the source consulted. For the purposes of this text, early, middle, and late phases will be described. However, it should be noted that the Alzheimer's Association lists seven stages for AD, with no symptoms to mild symptoms and diagnosis occurring in the first three phases. In the early course of AD, the person may demonstrate a loss of short-term memory. This involves more than common memory loss such as where the keys were put, and may involve safety concerns such as forgetting where one is going while driving. The inability to

perform math calculations and to think abstractly may also be evident. In the middle or moderate phase, many bodily systems begin to decline. The person may become confused as to date, time, and place. Communication skills become impaired and personality changes may occur. As cognitive decline worsens, the person may forget the names of loved ones, even their spouse. Wandering behavior as well as emotional changes, screaming, delusions, hallucinations, suspiciousness, and depression are common. The person with AD is less able to care for her- or himself and personal hygiene suffers. In the most severe and final phase, the person becomes completely dependent upon others, experiences a severe decline in physical and functional health, loses communication skills, and is unable to control voluntary functions. Death eventually results from body systems shutting down.

Although there is no single test, and the diagnosis may be one of exclusion, early diagnosis is important to maximize function and quality of life for as long as possible. Persons experiencing recurring and progressing memory problems or difficulties with daily activities should seek professional assistance from their physician. Warning signs of Alzheimer's are listed in **Table** 11-22.

Treatment for AD is difficult. There are several medications (such as Aricept, Namenda, and Razadyne) that may help symptoms (such as memory), but they do not slow the course of the disease. There is currently no cure. Nursing care will focus on symptom management, particularly in the areas of behavior, safety, nutrition, and hygiene. Dealing with behavioral issues such as wandering and outbursts poses a constant challenge. Recently, many long-term care facilities have instituted special units to care for Alzheimer's patients from the early to late stages of the disease. These units provide great benefits such as consistent and educated caregivers with whom the patient or resident will be familiar, a safe and controlled environment, modified surroundings to accommodate wandering behaviors, and nursing care 24 hours a day. Additionally, nurses are present to manage medications and document outcomes of therapies. However, many family members wish to care for their loved ones at home for as long as possible.

Table 11-22 TEN WARNING SIGNS OF ALZHEIMER'S DISEASE

Memory loss
Difficulty performing familiar tasks
Problems with language
Disorientation to time and place
Poor or decreased judgment
Problems with abstract thinking
Misplacing things
Changes in mood or behavior
Changes in personality
Loss of initiative

Source: Alzheimer's Association, 2005.

Thus, another important aspect of care in AD is care for the caregivers. Howcroft (2004) suggested that "support from carers is a key factor in the community care of people with dementia, but the role of the caregiver can be detrimental to the physical, mental, and financial health of a carer" (p. 31). She goes on to say that the caregivers of persons with AD would benefit from training in how to cope with behaviors that arise in these patients and how to cope with practical and legal issues that may arise.

Research from Paun, Farran, Perraud, and Loukissa (2004) showed that ongoing skills were needed by family caregivers to deal with the progressive decline caused by AD. Adapting to stress, working on time management, maximizing resources, and managing changing behavior

were all skills caregivers needed to develop in order to successfully manage home care of their loved ones. Caregivers needed not only to acquire knowledge and skills, but also to make emotional adjustments themselves to the ever-changing situation. Such findings suggest that nurses should focus a good deal of time on educating caregivers of persons with AD to cope with, as Nancy Reagan put it, "the long good-bye."

Scientists continue to explore the causes of AD and hope in the near future to be able to isolate the gene that causes it. In the meantime, results from a fascinating study (called the nun study) on a group of nuns who donated their brains to be examined and autopsied after death has suggested that there is a connection between early "idea density" and the emergence of AD in later life. That is, essays that the nuns wrote upon entry to the convent were analyzed and correlated with those who developed AD. It was found that those with lower idea density (verbal and linguistic skills) in early life had a significantly greater chance of developing AD (Snowden, 2004). The nun study has allowed researchers to examine about 500 brains so far in nuns who died between 75 and 107 years of age and discover other important facts such as a relationship between stroke and the development of AD in certain individuals, and the role of folic acid in protecting against development of AD (Snowden, 2004). Scientists from a number of fields continue to research the causes and possible treatments for AD. Snowden's research suggests that early education, particularly in verbal and cognitive skills, may protect persons from AD in later life.

Parkinson's Disease (PD)

PD is one of the most common neurological diseases. It affects both men and women, particularly those over the age of 50 years (American Parkinson Disease Foundation, 2005). PD was first described by Dr. James Parkinson as the "shaking palsy," so named to describe the motor tremors witnessed in those experiencing this condition.

A degenerative, chronic, and slowly progressing disease, PD has no known etiology, though several causes are suspected. There is a family history in 15% of cases. Some believe a virus or environmental factors play a significant role in the development of the disease. A higher risk of PD has been noted in teachers, medical workers, loggers, and miners, suggesting the possibility of a respiratory virus being to blame. More recent theories blame herbicides or pesticides. An emerging theory discusses PD like an injury related to an event or exposure to a toxin versus a disease. Interestingly, coffee drinking and cigarettes are thought to have a protective effect in the development of PD (Films for the Humanities and Sciences, 2004).

PD is a disorder of the central nervous system in which nerve cells in the basal ganglia degenerate. A loss of neurons in the substantia nigra of the brainstem causes a reduction in the production of the neurotransmitter dopamine, which is responsible for fine motor movement. Dopamine is needed for smooth movement and also plays a role in feelings and emotions. One specific pathological marker is called the Lewy body, which under a microscope appears as a round, dying neuron. There is no one specific test to diagnose PD.

The signs and symptoms of PD are many; however, there are four cardinal signs: bradykinesia (slowness of movement), rigidity, tremor, and gait changes. A typical patient with PD symptoms will have some distinctive movement characteristics with the components of stiffness, shuffling gait, arms at the side when walking, incoordination, and a tendency to fall backwards. Not all patients exhibit resting tremor, but most

have problems with movement, such as difficulty starting movement, increased stiffness with passive resistance, and rigidity as well as freezing during motion (National Institute of Neurological Disease and Stroke [NINDS], 2005). Additional signs, symptoms, and associated characteristics of PD appear in **Table 11-23.** Advanced PD may result in Parkinson's dementia.

Nurses should note that several other conditions may cause symptoms similar to PD, such as the neurological effects of tremor and movement disorders. These may be attributed to the effects of drugs or toxins, Alzheimer's disease, vascular diseases, or normal pressure hydrocephalus, and not be true PD.

Management of PD is generally done through medications. Levodopa, a synthetic dopamine, is an amino acid that converts to dopamine when it crosses the blood–brain barrier. Levodopa helps most of the serious signs and symptoms of PD. The drug helps at least 75% of persons with PD, mainly with the symptoms of bradykinesia and rigidity (NINDS, 2005). One important side effect to note is hallucinations. A more common treatment, and generally the drug of choice, involves a medication that combines levodopa and carbidopa (Sinemet), resulting in a decrease in the side effect of nausea seen with levodopa therapy alone, but with the same positive control of symptoms, particularly with relation to movement. Selegiline is another medication that interferes with one of the enzymes that breaks down dopamine. Dopamine receptor agonists such as Permax and Parlodel are synthetic compounds that mimic the effect of dopamine, but are not as powerful as levodopa. The earliest drugs used were anticholinergics such as Artane and Cogentin, and newer medications are being examined in clinical studies. Medications such as Sinemet show a wearing off effect, generally over a 2-year period. During this time, the person must take larger doses of the medication to achieve the same relief of symptoms that a smaller dose used to bring. For an unknown reason, if the medication is stopped for about a week to 10 days,

Table 11-23 SIGNS, SYMPTOMS, AND ASSOCIATED PROBLEMS SEEN IN PERSON'S WITH PD

Bradykinesia
Rigidity
Tremor
Pill rolling
Incoordination
Shuffling gait, arms at side
Freezing of movements
Balance problems (tendency to fall backwards)
Vocal changes; stuttering
Swallowing problems
Drooling
Visual disturbances
Bowel and bladder dysfunction
Sexual dysfunction
Dizziness
Sweating
Dyskinesias
Sleep pattern disturbances
Dementia
Memory loss
Emotional changes
Confusion
Nightmares
Twitching
Handwriting changes
Depression
Anxiety
Panic attacks
Hallucinations
Psychosis

the body will reset itself and the person will be able to restart the medication at the lower dose again until tolerance is again reached. This taking off time from the medication is called a "drug holiday," and is a time when the person and family need extra support, because the person's symptoms will be greatly exacerbated without the medication.

There are many other treatments for Parkinson's disease being explored. These include deep brain stimulation (DBS), with electrode-like implants that act much like a pacemaker to control PD tremors and other movement problems. The person using this therapy will still have the disease and generally uses medications in combination with this treatment, but may require lower doses of medication (NINDS, 2005). Thalamotomy, or surgical removal of a group of cells in the thalamus, is used in severe cases of tremor. Similarly, pallidotomy involves destruction of a group of cells in the internal globus pallidus, an area where information leaves the basal ganglia. In this procedure, nerve cells in the brain are permanently destroyed.

Fetal tissue transplants have been done experimentally in Sweden with mild success in older adults and more success among patients whose PD symptoms were a result of toxins. Stem cell transplant uses primitive nerve cells harvested from a surplus of embryos and fetuses from fertility clinics. This practice, of course, poses an ethical dilemma and has been the source of much controversy and political discussion.

A more recent promising development includes the use of adult stem cells, a theory that is promising but not yet well researched. Cells may be taken from the back of the eyes of organ donors. These epithelial cells from the retina are micro-carriers of gelatin that may have enough cells in a single retina to treat 10,000 patients (Films for the Humanities and Sciences, 2004). This is a more practical and ethically pleasing source of stem cells than embryos.

Much of the nursing care in PD is related to education. Because PD is a generally chronic and slowly progressing disorder, patients and family members will need much instruction regarding the course of the disease and what to anticipate. Instruction in the areas of medications, safety promotion, prevention of falls, disease progression, mobility, bowel and bladder, potential swallowing problems, sleep promotion, and communication are important. Most of the problems seen as complications of PD are handled via the physician as an outpatient, but certainly complications such as swallowing disorders as the disease progresses may require periods of hospitalization. When persons suffer related dementia in the last phases of the disease, they are often cared for in long-term care facilities that are equipped to handle the challenges and safety issues related to PD dementia. Areas for teaching appear in **Table 11-24**. In addition, access to resources and support groups are essential. A list of helpful resources and agencies is provided in **Box 11-5**.

Dizziness

Dizziness is quite common in older adults, affecting about 30% of those over age 65, and is the most common complaint in those over 75 who are seen by office physicians (Hill-O'Neill & Shaughnessy, 2002). There are four major types of dizziness according to Hill-O'Neill & Shaughnessy (2002): vertigo, presyncope (lightheadedness), disequilibrium (related to balance), and ill-defined (i.e., it does not fit in any other categories). Presyncope is when the older person complains of feeling faint or light-headed. It is associated with a drop in blood pressure such as

Table 11-24 CLIENT/FAMILY TEACHING REGARDING PD KEY AREAS

Medication therapy (side effects, wearing off, drug holidays, role of diet in absorption)
Safety promotion/fall prevention
Disease progression
Effects of disease on bowel and bladder, sleep, nutrition, attention, self-care, communication, sexuality, and mobility
Swallowing problems
Promoting sleep and relaxation
Communication
Role changes
Caregiver stress/burden—need for respite
Community resources

Source: Adapted from Easton, 1999, with permission.

Box 11-5 Resources for Those with PD

American Parkinson Disease Association
www.apdaparkinson.org
800-223-2732

National Parkinson Foundation
www.parkinson.org
800-327-4545

Parkinson's Disease Foundation
www.pdf.org
800-457-6676

Awakenings
www.parkinsonsdisease.com

National Institute for Neurological Disorders and Stroke (NINDS)
www.ninds.nih.gov
800-352-9424

Michael J. Fox Foundation for Parkinson's Research
www.michaeljfox.org
212-509-0995

occurs when the person sits up or changes to a standing position suddenly. It can be caused by medications that induce orthostatic hypotension, hypovolemia, low blood sugar, or some other cause of lack of blood flow to the brain. Other causes of the various types of dizziness mentioned above include cerebral ischemia, side effects of medications, Parkinsonian symptoms, hypotension, low blood sugar, anxiety attacks, and benign positional vertigo. Dizziness is generally treatable by addressing the cause. However, in some cases, such as dizziness associated with poststroke, it can be a permanent impairment.

Otological dizziness (a major classification in the elderly, according to Hain and Ramaswamy [2005]), refers to vertigo caused by changes in the vestibular system. The most common types in the elderly are **Meniere's syndrome** and **benign paroxysmal positional vertigo (BPPV)**. These two major causes of dizziness will be discussed here.

MENIERE'S SYNDROME

Meniere's syndrome is common in those over age 50. The cause is unknown, though it is often

attributed to a virus or bacterial infection. Signs and symptoms include a rapid decrease in hearing, a sense of pressure or fullness in one ear, accompanied by loud **tinnitus** (ringing in the ears) and then vertigo (Hain & Ramaswamy, 2005; Hill-O'Neill & Shaughnessy, 2002). A feeling of being unsteady or dizzy may even last for days after the episode.

Benign Paroxysmal Positional Vertigo (BPPV)

BPPV is the most common cause of dizziness in the older age group, accounting for as much as 50% of all dizziness, with an increasing incidence with age (Hain, 2003). BPPV occurs when the debris called **otoconia** ("rocks in the ears") become dislodged from their usual place in the ear and get stuck elsewhere in the vestibular system. Although in most cases the underlying cause of BPPV is not known, the degeneration of the vestibular system in the inner ear that occurs with normal aging is thought to play a major role. In cases of vertigo that do not respond to traditional medication for dizziness (such as Antivert), BPPV should be suspected.

Signs and symptoms of BPPV include dizziness, presyncope, feelings of imbalance, and nausea. The symptoms begin when the person changes head position, even something as usual as tipping the head back or turning the head in bed. A key to diagnosis is Hallpike's manuever, in which the patient is laid down quickly from a sitting position with the head turned to the side and hung over the back of the exam table. This will produce a characteristic nystagmus if the cause is BPPV.

BPPV can be treated in the office by the physician, advanced practice nurse, or even a physical therapist with knowledge of the proper maneuvers. The Epley maneuver is a technique by which the patient is put into a serious of specific positions and head turns to promote return of the otoconia to their proper place in the ear. After this treatment, the patient must stay in the office for 10 minutes and then sleep in a recliner chair at 45 degrees for the following two nights. They should also be instructed to avoid head positions that cause BPPV for at least another week (Hain, 2003). Other maneuvers and even surgical treatment may be necessary in rare variations of BPPV. These would be recommended by the physician on a case-by-case basis.

Dizziness, whatever the cause, can be particularly distressing to the older adult. It can interfere with activities of daily living, the ability to drive, and the maintenance of independence. Elders may decrease activities and spend more time at home due to the fear of dizzy spells or of falling. Early diagnosis of the cause of dizziness can result in better outcomes by addressing treatment sooner and avoiding complications that can result from bouts of syncope or vertigo. Nurses should encourage older adults with complaints of dizziness to seek medical help. Treatment may be with medication or simple maneuvers or lifestyle changes. Emotional support during diagnosis and testing, and reassurance that most causes of dizziness are treatable, can be a comfort to the older adult with this problem.

Seizures

Once thought to be mainly a disorder of children, recurrent seizures or epilepsy is thought to be present in about 7% of older adults (Spitz, 2005). Of the general population, epilepsy affects up to 3 million Americans (Velez & Selwa, 2003).

Seizures can be caused by a variety of conditions in older persons, but "the most common

cause of new-onset epilepsy in an elderly person is arteriosclerosis and the associated cerebrovascular disease" (Spitz, 2005, p. 1), accounting for 40%–50% of seizures in this age group (Rowan & Tuchman, 2003). Seizures are associated with stroke in 5%–14% of survivors (Spitz, 2005; Velez & Selwa, 2003). Other common causes of epilepsy in the elderly include Alzheimer's disease and brain tumor. A list of potential causes of seizures in older adults appears in Table 11-25.

There are three major classifications of epilepsies. Generalized types are more common in young people and associated with grand mal or tonic-clonic seizures. A number of cases have an undetermined origin and may be associated with certain situations such as high fever, exposure to toxins, or rare metabolic events. In older adults, localized (partial or focal) epilepsies are more common, particularly complex partial seizures. In contrast to young adults, Rowan and Tuchman (2003) cite other differences in seizures in the elderly: low frequency of seizure activity, easier to control, high potential for injury, a prolonged post-ictal period, and better tolerance with newer antiepileptic drugs (AEDs). Additionally, older adults may have coexisting medical problems and take many medications to treat these problems.

Signs and symptoms of epilepsy include seizures as the most obvious, although changes in behavior, cognition, and level of consciousness may be other signs. Diagnosis is made by careful description of the seizure event, a thorough history and physical, complete blood work, chest x-ray, electrocardiogram (ECG), and electroencephalogram (EEG) to help determine the type of seizure.

Treatment for epilepsy is aimed at the causal factor. The standard treatment for recurrent seizures is AEDs. The rule of thumb "start low and go slow" for medication dosing in older adults particularly applies to AEDs. The elderly tend to have more side effects, adverse drug interactions, and problems with toxicity levels than younger people.

Recent research has suggested that older adults may have better results with fewer side effects with the newer AEDs than the traditional ones, though about 10% of nursing home residents are still medicated with the first generation AEDs (Mauk, 2004). The most common medications used to treat seizures include barbiturates (such as phenobarbital), benzodiazepines (such as diazepam/Valium), hydantoins (such as phenytoin/Dilantin), and valproates (such as valproic acid/Depakene) (Deglin & Vallerand, 2005). Several newer drugs are also used, depending on the type of seizure. These newer medications include carbamazapine (Tegretol), oxycarbazepine (Trileptal), and topiramate (Topamax) (Uthman, 2004). Each of these medications has specific precautions for use in patients with certain types of medical problems or for those taking certain

Table 11-25 POSSIBLE CAUSES OF SEIZURES IN THE ELDERLY

Stroke or other cerebrovascular disease
Arteriosclerosis
Alzheimer's disease
Brain tumor
Head trauma
Intracranial infection
Drug abuse or withdrawal
Withdrawal from antiepileptic drug

other medications. When assessing for side effects in older patients, be sure to be alert to potential GI, renal, and hepatic side effects. Additionally, some newer extended-release AEDs are thought to be better tolerated and have a lower incidence of systemic side effects (such as tremors) (Uthman, 2004).

Musculoskeletal Disorders

Osteoporosis

Osteoporosis is a bone disorder characterized by low bone density or porous bones. Over 44 million Americans including 55% of adults age 50 and over have this disease. Although often thought of as a woman's disease, 80% of cases are women and 20% are men (National Osteoporosis Foundation, 2005). Older persons of all ethnic backgrounds may experience osteoporosis, though it is more common among whites and Asians. The risk factors for this disorder are many, and appear in **Table 11-26**.

A major complication of osteoporosis is fractures. These are especially common in the vertebral spine, hips, and wrists. The cost in 2002 related to osteoporotic hip fractures alone was more than $18 billion (National Osteoporosis Foundation, 2005). Because there are sometimes no signs or symptoms during the early course of

Table 11-26 Risk Factors for Osteoporosis

Personal history of fracture after age 50
Current low bone mass
History of fracture in a first-degree relative
Being female
Being thin and/or having a small frame
Advanced age
A family history of osteoporosis
Estrogen deficiency as a result of menopause, especially early or surgically induced
Abnormal absence of menstrual periods (amenorrhea)
Anorexia nervosa
Low lifetime calcium intake
Vitamin D deficiency
Use of certain medications, such as corticosteroids and anticonvulsants
Presence of certain chronic medical conditions
Low testosterone levels in men
An inactive lifestyle
Current cigarette smoking
Excessive use of alcohol
Being white or Asian, although African Americans and Hispanic Americans are at significant risk as well

Source: From the National Osteoporosis Foundation, 2005, p. 1.

Case Study 11-6

Mrs. Chiu is a small, 100-pound, 90-year-old Chinese woman with fractures of the vertebral spine. Because of kyphosis and pain associated with osteoporosis, Mrs. Chiu has been bedbound in a nursing home for several months. Her family visits regularly and has many questions about her condition, especially if it is something that her teenage granddaughters might develop.

Questions:

1. What are Mrs. Chiu's known risk factors for osteoporosis and resulting fractures?
2. How should you answer the family's questions?
3. Are the granddaughters at risk because Mrs. Chiu has osteoporosis? If so, what can they do to prevent it?
4. What teaching should be done with this family?

bone deterioration, osteoporosis is often undiagnosed and untreated until fracture occurs. Such fractures may lead to immobility and other complications. If signs and symptoms are present besides fractures, they may take the form of pain and kyphosis (**Figure** 11-9). Diagnostic testing would reveal decreased bone density and any pathological fractures present via x-ray.

Because this is a highly treatable and often preventable disease when detected early, all women over the age of 65 years should have **bone mineral density (BMD)** or bone mass measurement done. Steps can be taken to prevent osteoporosis by habits that help build strong bones before the age of 20, when bones are fully developed. Preventing osteoporosis in adolescent years would include eating a well-balanced diet with plenty of calcium and vitamin D, no smoking or excessive alcohol intake, plenty of weight-bearing exercise, and discussing any needed treatments with the physician to minimize the risk of the disease. It should be noted that most of the calcium in the diet of American children comes from milk, though yogurt, broccoli, and certain enriched cereals may provide additional sources. Nurses can be active in primary prevention of osteoporosis through educating children in the schools about the effects of this disease in later life and how to prevent it.

Treatment of existing osteoporosis takes many forms. Postmenopausal women are often prescribed biphosphonates (such as Fosamax), calcitonin (Miacalcin), or estrogen/hormone replacement medications (such as Estratab or Premarin). Some of these medications are aimed at promoting adequate amounts of calcium in the bones, whereas the hormone replacement therapies replace estrogen not being produced after menopause to create more of a balance between the delicate hormones that guide bone reabsorption and demineralization. The use of estrogen replacement therapy has been shown to decrease the incidence of serious fractures in postmeno-

Figure 11-9 Kyphosis.

Source: © Bill Aron/PhotoEdit

pausal women, though there are side effects that should be discussed with the physician before a woman uses this option. Weight-bearing exercises and getting enough calcium in the diet or through supplementation are other treatments to consider. Nurses should encourage patients to discuss all treatment options with their physicians. Nutritional counseling and the role of sunlight and exercise should also be addressed.

Arthritis

Arthritis, or inflammation of the joint, is the number one chronic complaint and cause of disability in the United States (Mayo Clinic, 2005), affecting nearly 66 million people with a cost of $86.2 billion per year (Arthritis Foundation, 2005). There are over 100 types of arthritis, with the two most common being osteoarthritis (OA) and rheumatoid arthritis (RA). These will be discussed here in relationship to their impact on the lives of older adults.

Osteoarthritis

Osteoarthritis (OA) is also called joint failure syndrome or degenerative joint disease. OA affects about 21 million Americans (Mayo Clinic, 2005). Over half of those age 65 and over are affected (Yurkow & Yudin, 2002). This disease is characterized by chronic deterioration of the cartilage at the ends of the bones that eventually results in bones at the joint rubbing against each other and the formation of bone spurs.

The cause of OA is unknown, but it affects females more often than males, and risk increases with certain factors. Persons who are over age 45, obese, have a history of sports injuries to the joints, or those with a family history of OA are thought to be at increased risk. Weakness of the muscles around the knee joint is another predisposing factor (Arthritis Foundation, 2005).

Signs and symptoms of OA include pain, stiffness (especially in the morning), aching, some joint swelling, and inflammation. OA targets joints such as the fingers, feet, knees, hips, and spine (Yurkow & Yudin, 2002). Heberden's nodes (bony enlargements at end joints of fingers) and Bouchard's nodes (bony enlargements at middle joints of fingers) are common (**Figure 11-10**). Radiographs would show increased heat at the site of inflammation as well as bone deterioration. As OA progresses, the individual may experience crepitus, limping, limited range of motion, increased pain, and even fractures. Diagnosis is made through various lab test, x-rays, MRIs, or CT scans to visualize areas of damage.

Figure 11-10 Bouchard's and Herberden's nodes.

Source: © Visuals Unlimited

The most common associated complication of OA is pain. Although there is no cure for OA, treatment is generally aimed at symptom reduction through lifestyle modifications, nonpharmacological therapies, and medication. For example, risk factors that can be modified such as excessive stress to the joint (perhaps caused by sports or obesity) should be addressed with exercise programs for strengthening muscles and weight loss (**Case Study 11-6**). Exercise programs that are holistic and interdisciplinary, particularly those offered in rehabilitation units, may help individuals cope with pain and increase functional levels. In addition, many persons use alternative methods of pain control in combination with medications. **Table 11-27** provides a summary of common treatments for pain for those with OA.

Medications used for treatment of OA include acetaminophen (Tylenol), aspirin, nonsteroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen and naproxen, COX-2 inhibitors (such as celecoxib/Celebrex), Tramadol (Ultram), and antidepressants. Other therapies include injection of steroids into the joint to decrease inflammation, or injection of synthetic material (such as Synvisc) that acts as a lubricant in the absence of synovial fluid to provide comfort. Other therapies to preserve motion and decrease pain include heat or cold, splints, adaptive equipment, aquatic therapy, and nutrition. In cases of severe dysfunction and pain, surgery with joint replacement may be an option.

Important for any nurse caring for older persons taking NSAIDs is the awareness of common side effects. The most common adverse affects of NSAIDs include gastrointestinal symptoms such as stomach upset, nausea, vomiting, and more seriously, gastric ulcers. COX-2 drugs were thought to minimize these effects, though more recently Vioxx and Celebrex as well as other medications in this classification have come under scrutiny due to rare reports of serious side effects such as MI and stroke (Moore, Derry, Makinson, & McQuay, 2005).

Rheumatoid Arthritis (RA)

RA is characterized by remissions and exacerbations of inflammation within the joint. It affects the fingers, wrists, knees, and spine. In contrast to OA, RA is due to chronic inflammation that can cause severe joint deformities and loss of function over time (**Figure 11-11**).

RA affects over 2 million Americans and is more common in women than men. RA is generally diagnosed between the ages of 20 and 50 and can cause significant disability for adults who live into old age with this disorder (Mayo Clinic, 2005). Although the cause is unknown, researchers believe it may be due to a virus or hormonal factors.

Risk factors for RA include being female, having a certain predisposing gene, and expo-

Table 11-27 Treatments for Pain Associated with Osteoarthritis

Pharmacological	Nonpharmacological
Acetaminophen	Moist heat
Aspirin	Warm paraffin wraps
NSAIDs	Stretch gloves or stockings
Capsaicin (topically, with other therapies)	Range of motion
Nabumetone	Exercises
	Upper extremity activities (such as piano playing, typing, car playing)
	Swimming
	Adaptive equipment
	Heat/cold applications
	Warm bath (limit to 20 minutes)
	Good posture
	Supportive shoes
	Well-balanced diet
	Maintenance of appropriate weight

Source: From Easton, 1999, p. 292; adapted with permission.

Figure 11-11 Rheumatoid arthritis.

Source: Leonard Crowley, *Introduction to Human Disease* (6th ed.). Sudbury, MA: Jones and Bartlett Publishers, 2005.

sure to an infection. Advanced age is a risk factor until age 70, after which incidence decreases. Cigarette smoking over a period of years is another risk factor.

Signs and symptoms of RA are systemic and include malaise, fatigue, symmetrical patterns of joint inflammation, pain, stiffness, swelling, gelling (joints stiff after rest), elevated sedimentation rate, presence of serum rheumatoid factor, and elevated WBC in synovial fluid of the inflamed joint. Radiographs will show erosion of the bone. Pain is more prevalent in RA, and joint deformities can cause more debilitation than is generally seen with OA. In addition, RA often strikes in young to middle adulthood, with more degeneration seen over time than with OA.

The treatment for RA is similar to OA with the exception that anti-inflammatory and immune-suppressing drugs may play a more important role. DMARDs (disease-modifying anti-rheumatic drugs) are also used in RA. These medications may not show results for several months, and nurses should teach patients to recognize signs of infections such as chills, pain, and fever.

Nurses should expect to see many complications associated with arthritis. Some potential nursing diagnoses are pain, impaired physical mobility, fatigue, decreased endurance, powerlessness, self-care deficits, sleep pattern disturbance, depression, impaired coping, social isolation, fear, anxiety, and body-image disturbance. Goals for care include promoting independence within limitations, pain management, and education.

Educational programs for persons with arthritis should include exercise and mobility, education, counseling, individual PT and OT, and a focus of independence in **activities of daily living (ADLS)** with self-care. These types of programs help decrease disability, pain, and the need for assistance, as well as reduce joint tenderness. Pain coping and exercise training may also enhance pain control.

Joint Replacement

Joint replacement is used for several different purposes including fracture, immobility, and intractable pain. The two most commonly performed joint replacement surgeries are total hip arthroplasty and total knee arthroplasty. Knee replacements are mainly related to advanced arthritis that causes severe pain with decreased function. Hip replacements may be done related to arthritis or due to fracture, usually from falling.

Dunlop, Song, Manheim, and Chang (2003) reported significantly less numbers of joint replacements done on Hispanics and blacks than whites, due to reasons beyond access and financial resources. The researchers suggested that cultural differences, values, and attitudes may also play a role in seeking joint replacement.

Total Hip Arthroplasty/Replacement

Hip replacement surgery may be indicated when an older person demonstrates lack of function, trouble with ADLs, and continued pain that is not sufficiently addressed with traditional medical therapy. Certainly those with certain types of hip fractures will be candidates for this surgery also. In women, body weight and older age have been found to be risk factors for needing hip replacement due to OA (National Institute of Arthritis and Musculoskeletal and Skin Diseases, 2003).

During hip replacement, a prosthetic device made of metal and plastic is substituted for the worn out, damaged, or fractured portions of the hip. The implant is made of a ball-type device on a stem that fits into the femur. The socket of

the pelvis helps hold the ball that is articulated onto the joint (**Figure 11-12**). During surgery, physicians may choose to cement the prosthesis into the femur or not. Postoperatively, the person will stay in acute care for several days to a week, and then many older adults may need rehabilitation services as inpatients or outpatients, depending on comorbidities and physical condition. Weight bearing is progressive and depends upon the physician's orders based on the condition of the bones observed during surgery. It is essential that the nurse and other team members strictly observe weight-bearing instructions (such as toe-touch, partial, or full) to avoid injury to the healing hip. Dislocation of the prosthesis can also result from not following routine hip precautions after surgery. Routine hip precautions include not crossing the legs at the knees or ankles, not bending in the chair more than 90 degrees, keeping a pillow between the knees (maintain abduction) until determined by the physician, and avoiding lying on the operative side until the physician gives permission to do so.

Nursing instruction to patients and family members should include watching for signs and symptoms of wound infection. Patients should report any redness, swelling, drainage, or odor from the operative site. A small amount of brownish drainage from the site a few days postoperatively is normal. Staples are generally used to close the wound, with a nonstick dressing applied. Staples are usually removed 7–10 days after surgery, depending on healing of the

Figure 11-12 Total hip prosthesis.

Source: Leonard Crowley, *Introduction to Human Disease* (6th ed.). Sudbury, MA: Jones and Bartlett Publishers, 2005.

wound. Sometimes physicians will order half of the staples removed initially and the other half later. Steri strips may be applied to assist with wound edge approximation. Fever or malaise could also be signs of infection and should be promptly reported to the physician.

Additionally, reminders about routine hip precautions, exercises and ambulation as indicated by the physical therapist, and traveling implications should be given. Some prostheses will cause the alarm at airport security to go off. Teach patients to inform security personnel of their hip prostheses prior to entering the security gate.

Dr. Robert Zann, an orthopedic specialist, stated that recovery from hip replacement surgery is generally longer than many patients think: "It is interesting that patients undergoing hip replacement surgery will uniformly reach their maximum improvement between 1-2 years" (p. 1). Physicians attribute this to the need for tissue healing (of which 90% occurs in the first 3 months) and return of muscles to normal function and strength, which takes longer.

Total Knee Arthroplasty/Replacement

Similar to hip replacement, knee replacement is done when a person is experiencing decreased range of motion, trouble walking or climbing stairs, and increased degeneration of the joint as to impair quality of life. This most often occurs as a result of arthritis.

Knee replacement surgery involves resurfacing or removal of the distal portion of the femur that articulates with the end of the shin bone. The prosthesis consists of metal and plastic or similar materials that are cemented onto the newly resurfaced areas of the articulating bones. Although often done under general anesthetic, this surgery can also be performed under spinal anesthesia. Sometimes blood loss is significant, so patients may be asked to donate their own blood ahead of time to be given back to them in the event it is needed. In addition, a growing trend is towards bilateral knee replacement in those persons requiring both knees to be surgically repaired. The benefits of this are the one-time operative anesthetic and room costs, and many physicians feel recovery from bilateral replacement is similar to single replacement. However, the pain and lack of mobility, as well as the significant increase in the assistance needed after surgery when a bilateral replacement is done, may make this less than ideal for most older patients.

Discomfort after knee surgery is generally severe in the first few days. Nurses should encourage patients to use cold packs on the operative area for the first day and take pain and sleeping medications as ordered. In addition, alternative therapies such as guided imagery have been shown to help with pain management (Antall & Kresevic, 2004). Many joint replacement patients feel a loss of control and independence. Nurses can help the recovery process by maintaining a professional therapeutic relationship with patients. This has been shown to assist older persons in regaining their sense of independence (Loft, McWilliam, & Ward-Griffin, 2003).

Therapy will begin immediately in the acute care hospital. Although weight bearing does not usually occur until 24 hours after surgery, sitting in a chair and using a continuous passive motion machine (CPM) (if ordered) will ease recovery. The use of a CPM is generally based on the surgeon's preference. There is research to support it, as well as studies indicating that walking soon after surgery has an equal effect and makes the CPM unnecessary. However, in cases of an older person who may not have the mobil-

ity skills initially after surgery that a younger person would, a CPM may be beneficial to keep the joint flexible and decrease pain.

Dr. Zann indicated that "patients undergoing total knee replacement do not achieve their maximum improvement until 2-4 years" (p. 1). This is attributed to the lack of muscular structures that surround and protect the knee and the need for the ligaments and tendons to adapt to the indwelling prosthesis. Recovery times vary and depend upon a number of variables, including the patient's overall health, age, comorbidities, and motivation. Patients report that the new knee joint never feels normal even years after the surgery, but they do experience an increase in function and generally much less pain than before.

Nursing implications include teaching the patient about signs and symptoms of infection, care of the surgical site (if staples are still present), pain management, and expectations for recovery. A range of motion from 0–90 degrees is the minimum needed for normal functioning. Most prostheses will allow up to about 120 degrees of flexion, though 110 degrees is considered good range of motion after knee replacement. After discharge, a walker is usually used in the first few weeks, followed by light activities 6 weeks after surgery. In addition, the patient's spouse may experience feelings of being overwhelmed due to role transitions that occur after surgery and during the recovery period. Nurses can help facilitate this transition by providing education and discussing realistic expectations (Showalter, Burger, & Salyer, 2000).

Amputation

According to the American Academy of Physical Medicine and Rehabilitation, physiatrists see about 50,000 new amputees annually (2005). Two thirds of these cases are from circulatory problems, particularly PVD related to diabetes. Most of the rest are attributed to trauma.

Most amputations involve the lower extremities, above or below the knee. The greatest risk factor for amputation is diabetes with accompanying peripheral vascular disease. Advanced age and the incidence of diabetes in the elderly make this a potential problem in the older age group. Additionally, a recent study showed that HgbA1c level was a significant predictor of foot amputation (Watts, Daly, Anthony, McDonald, Khoury, & Dahar, 2001).

In the acute phase of recovery after surgery, it is important to prevent contractures of the knee joint (if present) and attempt to maintain normal muscle power and range of motion in remaining joints. The limb should not be hung over the bedside or placed in a dependent position. Both in acute care and rehabilitation, the stump should be conditioned to prepare for the wearing of a prosthesis. In certain circumstances, an older person may choose, in consultation with the physician, not to wear a prosthesis. This generally occurs when there are other health issues such as poor balance from another disease or disorder that would make falling and injury more likely with prosthetic use.

Initially, there may be drainage from the surgical site, and a sterile dressing will be kept in place and changed at least daily. Eventually, the staples or sutures will be removed and a thick, black eschar will form at the amputation site and gradually come off. An ace wrap or stump shrinker sock (elastic) is used to help prepare the stump for wearing the prosthesis. Several factors should be considered when preparing the stump to wear a prosthesis. These include a movable scar, lack of tenderness/sensitivity, a conical shape, firm skin, and lack of edema. All of these can be achieved by proper wrapping of the stump to

maximize shrinkage and minimize swelling. The prone position, if tolerable, is an excellent way to promote full extension of the residual limb.

It is also important for the person to begin therapy right away. The *Merck Manual of Geriatrics* (Beers, 2005) states "ambulation requires a 10 to 40% increase in energy expenditure after below-the-knee amputation and a 60 to 100% increase after above-the-knee amputation. To compensate, elderly amputees generally walk more slowly" (p. 284). When using the prosthesis at first, an older adult may tire easily. Be sure to take into account any coexisting problems such as cardiopulmonary disease when considering energy expenditure. The newest technologies allow prosthetics to be light, durable, and more comfortable.

Nurses will need to teach patients and families about stump care, mobility, adaptation, coping, and self-care. Home maintenance, dealing with complication and/or additional health problems, wear and tear on nonweight-bearing joints, adapting to the environment, accessibility, stigma, depression, role changes, decreased energy, and chronic pain are all issues to be aware of related to amputation. It is likely that the person with lower extremity amputation will experience some shoulder problems over time due to the additional stress on this nonweight-bearing joint. Remember that alteration in body image is a significant hurdle to overcome for some individuals. **Phantom limb pain**, or pain sensations in the nonexistent limb, is more common after traumatic amputations and may last for weeks after amputation. Massage and medications may help with this type of pain control (*Merck Manual for Geriatrics*, 2005). Additionally, proper wrapping of the stump (in a figure-eight wrap) may help decrease the chance of phantom limb pain later (Easton, 1999).

In general, older persons with amputation may return to a normal quality of life with some adaptations. The care provided by nurses and physicians in rehabilitation after amputation may make the difference in the person's ability to cope with the changes that result after surgery. Geriatric nurses can facilitate the transition back into the community after amputation by educating patients and families about resources to assist with adaptation.

Sensory Impairments

Although there are many normal aging changes that occur in the sensory system, most of the common abnormalities seen in the elderly related to vision. According to Lighthouse International, a leading resource on vision impairment and visual rehabilitation, the most common age-related vision problems are cataracts, glaucoma, macular degeneration, and diabetic neuropathy (2005). This section will discuss these impairments and others. Diseases related to the senses of touch, hearing, and taste are rare, though neuropathy will be addressed in a different section as related to diabetes. The other most common sensory problem in older adults is chronic sinusitis. This will also be discussed.

Cataracts

Cataracts are so common in older adults that some almost consider them an inevitable consequence of old age. The etiology is thought to be from oxidative damage to lens protein that occurs with aging. Although about half of people between 65 and 75 years of age have cataracts, they are most common in those over age 75 (70%), and there are no ethnic or gender variations (Trudo & Stark, 1998, p. 2). The two most common causes are advanced age and heredity,

though contributing factors also include diabetes, poor nutrition, hypertension, excessive exposure to sunlight (ultraviolet radiation), cigarette smoking, high alcohol intake, and eye trauma (Lighthouse International, 2005).

Cataracts cause no pain or discomfort, but persons will present with a gradual loss of vision that may begin with complaints of vision being fuzzy, sensitivity to glare, and noticing a halo effect around lights. Decreased night vision and a yellowing of the lens, as well as trouble distinguishing colors, may also be noted. Eventually the pupil changes color to a cloudy white (**Figure 11-13**). Generally, the most common objective finding is decreased visual acuity, such as that measured with a Snellen eye chart.

Although changes in eyeglasses are the first option, when quality of life becomes affected, the most effective treatment to treat cataracts is surgery. This is the most common operation among older adults, and more than 95% of them have better vision after surgery (Trudo & Stark, 1998). The benefits of surgery include improved visual acuity, depth perception, and peripheral vision, leading to better outcomes related to ADLs and quality of life. Complications associated with surgery are rare but include retinal detachment, infection, and macular edema. Surgery is relatively safe and done as an outpatient procedure. The lens is removed through an incision in the eye and an intraocular lens is inserted. The surgical incision is either closed with sutures or can heal itself. After surgery, patients will need to avoid bright sunlight; wear wrap-around sunglasses for a short time; and avoid straining, lifting, or bending. Cataract surgery today offers a safe and effective treatment to maintain independence and improve quality of life for older adults.

Glaucoma

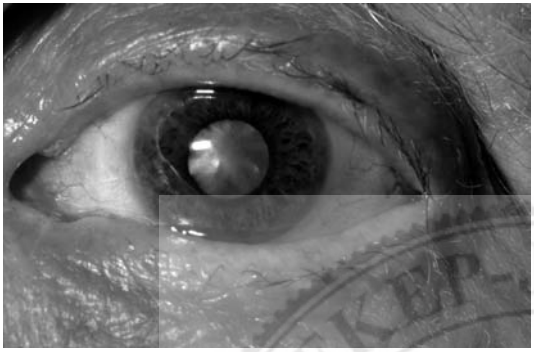
Glaucoma is a group of degenerative eye diseases in which the optic nerve is damaged by high **intraocular pressure (IOP)** resulting in blindness due to nerve atrophy (Podolsky, 1998). Glaucoma is a leading cause of visual impairment, responsible for 10%–20% of all blindness in the United States, and occurs more often in those over 40, with an increased incidence with age (3% to 4% in those over age 70) (Malone, Fletcher, & Plank, 2000; Podolsky, 1998).

Unlike cataracts, there are some ethnic distinctions with the development of glaucoma. Blacks tend to develop it earlier than whites, and females more often than males. Glaucoma is more common in African Americans, Asian Americans, and Eskimos. Other contributing factors include eye trauma, small cornea, small anterior chamber, family history, cataracts, and some medications (Eliopoulos, 2005; Malone, Fletcher, & Plank, 2000).

Although the cause is unknown, glaucoma results from pupillary blockage that limits flow of aqueous humor, causing a rise in intraocular pressure (IOP). Two major types are noted here: acute and chronic. Acute glaucoma is also called closed angle or narrow angle. Signs and symptoms include severe eye pain in one eye, blurred vision, seeing colored halos around lights, red eye, headache, nausea, and vomiting. Symptoms may be associated with emotional stress.

Chronic glaucoma, also called open angle or primary open angle, is more common than acute (90% of cases are this type), affecting over 2 million people in the United States. This type of glaucoma occurs gradually. Peripheral vision is slowly impaired. Signs and symptoms include tired eyes, headaches, misty vision, seeing halos around lights, and worse symptoms in the morn-

Figure 11-13 Cataracts.



Source: © Dr. P. Marazzi/Science Photo Library/Custom Medical Stock Photo.

ing. Glaucoma often involves one eye, but may occur in both.

Early detection and treatment are essential in preventing loss of vision, because once vision has been lost to glaucoma, it cannot be restored. Diagnosis is made using a **tonometer** to measure IOP. Normal IOP is 10–21 mm Hg. Ophthalmoscopic examination will reveal changes in the color and contour of the optic nerve when glaucoma is present. **Gonioscopy** (direct exam) provides another means of evaluation.

Treatment is aimed at reducing IOP. Medications to decrease pressure may be given, and surgical iridectomy to lower the IOP may prevent future episodes of acute glaucoma. In chronic glaucoma, there is no cure, so treatment is aimed at managing IOP through medication and eyedrops. Nurses should monitor patients for response to medications and to verify that eyedrops are being taken regularly and properly. In addition, older adults should be assessed for safety related to visual changes and also reminded to keep regular visits with their eye doctor.

Macular Degeneration

Age-related macular degeneration (ARMD) is the most common cause of blindness for those over age 60, affecting about 12 million Americans over the age of 40 and more than 1 out of every 3 people over age 75 (Seftel, 2005; Starr, Guyer, & Yannuzzi, 1998). Risk factors for this sensory problem include high cholesterol, hypertension, diabetes, smoking, overexposure to ultraviolet light, and heredity. Macular degeneration results from damage or breakdown of the macula and subsequent loss of central vision. Generally associated with the aging process, it can also result from injury or infection. Two types are noted: dry (nonexudative) and wet (exudative). Dry macular degeneration affects 90% of those with the disease (Lighthouse International, 2005) and has a better prognosis. The dry type progresses slowly with more subtle changes in vision than the wet type, which comes on suddenly and may cause more severe loss in vision. The signs and symptoms of ARMD are decreased central vision, seeing images as distorted, decreased color vision, and sometimes a central scotoma (a large, dark spot in the center of vision).

Although there is no cure for macular degeneration, some new therapies show promise (**Case Study 11-7**). Photodynamic therapy uses a special laser to seal leaking blood vessels in the eye. Antioxidant vitamins (C, D, E, and beta-carotene) and zinc also seem to slow the progress of the disease (Age-Related Eye Disease Study Authors [AREDS], 2001). Retinal cell transplantation or regeneration works by harvesting cells from the body and injecting them into diseased macular sites in the hope that new and healthy cells will grow, thus reversing the damage caused by ARMD (Mascular Degeneration Foundation, 2005).

Chances are that most gerontological nurses will care for older adults with ARMD. Initially, small changes in the environment should be encouraged, such as better lighting in hallways, minimizing glare from lamps or shiny floors, and decorating living spaces in contrasting colors (McGrory & Remington, 2004). Visual adaptive devices such as magnifying glasses and reading lamps may provide temporary help as vision worsens. Auditory devices such as books on tape and adaptation of the environment to the visual impairment may help maintain independence. Nurses should be aware of the treatments being researched and can assure patients that although there is no cure at present, there is hope for the future. In addition, nurses should teach the elderly that the modification of any controllable risk factors, such as smoking cessation, can decrease risk of developing ARMD.

Diabetic Retinopathy

Diabetic retinopathy is a leading cause of blindness among older adults, resulting from breakage of tiny vessels in the retina as a complication of diabetes. It generally affects both eyes. The longer a person has diabetes, the more likely they are to suffer visual impairment (Eyecare America, 2005). Early diagnosis and treatment can prevent much of the blindness that occurs from this disorder.

There are four stages of diabetic retinopathy. These appear in **Table 11-28**. Of the four stages, proliferative retinopathy is the most severe. As new fragile and abnormal blood vessels grow to compensate for the blocked vessels in the retina, these vessels may leak blood into the eye, causing swelling of the macula and blurred vision. This is what causes much of the blindness seen with diabetic retinopathy.

Box 11-6 Resources for Those with Visual Impairments

American Academy of Ophthalmology
P.O. Box 7424
San Francisco, CA 94120-7424
(415) 561-8500
www.aao.org

EyeCare America
A Public Service Foundation of the American Academy of Opthamology
1-877-887-6327
1-800-222-3937
www.eyecareamerica.org/public

Lighthouse International
111 East 59th Street
New York, NY 10022-1202
1-800-334-5497
1800-829-0500
www.lighthouse.org

Macular Degeneration Foundation, Inc.
www.eyesight.org

National Eye Institute
31 Center Drive MSC 2510
Bethesda, MD 20892-2510
(301) 496-5248
http://www.nei.nih.gov

American Printing House for the Blind
P.O. Box 6985
1839 Franklin Avenue
Louisville, KY 40206
www.aph.org

American Council of the Blind
1155 15th Street, NW, Suite 720
Washington, DC 20005
www.acb.org

Case Study 11-7

Mrs. Booker has recently been diagnosed with ARMD. She is distressed to feel she is going blind and there is nothing she can do about it. She expresses these frustrations to the nurse and asks for help.

Questions:

1. What should the nurse's response be?
2. What initial adaptations need to be made early in the disease process?
3. Are there any things that Mrs. Booker can do now to help modify her environment for this progressive vision loss? What would those things be?
4. To which resources should the nurse refer Mrs. Booker for further information and support?

There are no early warning signs of diabetic retinopathy, so it is essential that older adults with diabetes have a dilated eye exam each year. During the eye exam the eye care professional will do a visual acuity test, a dilated eye exam, and tonometry. The first three stages of diabetic retinopathy are not treated. If a person complains of seeing spots floating in the visual field, bleeding may be occurring and the person should see an eye doctor as soon as possible.

Proliferative retinopathy is treated using a procedure called **scatter laser treatment** that helps shrink the abnormal vessels. This procedure may require at least two visits, because

Table 11-28 FOUR STAGES OF DIABETIC RETINOPATHY

Stage	Description	Pathophysiology
Stage 1	Mild nonproliferative retinopathy	Microaneurysms in retina
Stage 2	Moderate nonproliferative retinopathy	Blockage of some blood vessels supplying retina
Stage 3	Severe nonproliferative retinopathy	Blockage of many blood vessels supplying retina; retina is deprived of needed circulation
Stage 4	Proliferative retinopathy	Advanced stage; new blood vessels that are abnormal and easily breakable form to compensate for blockage of circulation to retina; these vessels may break and leak to cause macular edema and blurred vision

Source: National Eye Institute, 2005.

multiple areas away from the retina are burned with a laser in order to shrink abnormal vessels. Although patients may note some loss of peripheral, night, and/or color vision with this procedure, it is the standard for preserving the majority of central and essential vision.

For more severe cases of bleeding in the eye, a **vitrectomy** may be needed. When blood collects in the center of the eye, a vitrectomy allows removal of the vitreous gel that has blood in it through a small incision in the eye. The blood-contaminated vitreous gel is replaced with a saline-type solution. This is often done as an outpatient procedure. The patient will need to wear an eye patch for days to weeks and use medicated eyedrops to prevent infection. After a vitrectomy, the person's eye may be red and sensitive for some time.

The most important nursing consideration in caring for older persons who may be at risk for diabetic retinopathy is to emphasize prevention of this complication. Treatment becomes necessary with more severe cases, so the best treatment is prevention through regular eye exams, good control of blood sugars, monitoring hypertension, and controlling cholesterol levels. The nurse should encourage the older adult with diabetes to develop a good working relationship with a trusted eye care professional.

Retinal Detachment

Although not as common as the other visual problems discussed, **retinal detachment** may occur in the older adult. It can be the result of trauma to the eye. Symptoms may be gradual or sudden and may look like spots moving across the eye, blurred vision, light flashes, or a curtain drawing. If an older person presents with such symptoms, seek immediate medical help. Keep the person quiet to minimize further detachment. Surgery may be required to save vision.

Corneal Ulcer

Corneal ulcers are more common in the elderly due to decreased tearing that occurs with normal aging. The ulcers may result from inflammation of the cornea related to stroke, fever, irritation, or a poor diet. Corneal ulcers are difficult to treat and may leave scars that affect vision. Signs of corneal ulcer may include bloodshot eye, photophobia, and complaint of irritation. The nurse should encourage the older person to seek prompt assistance from an eye care professional.

Chronic Sinusitis

Consistently one of the top 10 chronic complaints of the elderly is chronic sinusitis (Eliopoulos, 2005). Over 15% of older persons report having this condition (Stotts & Deitrich, 2004). This results from irritants blocking drainage of the sinus cavities, leading to infection. When symptoms continue over a period of weeks and up to 3 months and are often recurring, chronic sinusitis should be suspected. Symptoms include a severe cold, sneezing, cough (that is often worse at night), hoarseness, diminished sense of smell, discolored nasal discharge, postnasal drip, headache, facial pain, fatigue, malaise, and fever (Kelley, 2002). Upon physical examination, the person may complain of pain on palpation of the sinus areas, and edema and redness of the nasal mucosa may be evident. Allergies, common cold, and dental problems should be ruled out for differential diagnosis. A CT scan of the sinuses will show areas of inflammation.

Treatment for chronic sinusitis is with antibiotics, decongestants, and analgesics for pain. Inhaled corticosteroids may be needed to reduce

swelling and ease breathing. Irrigation with over-the-counter normal saline nose spray is often helpful and may be done 2–3 times per day. The person with chronic sinusitis should drink plenty of fluids to maintain adequate hydration and avoid any environmental pollutants such as cigarette smoke or other toxins. Chronic sinusitis is a condition that many older adults wrestle with their entire lives. Avoidance of precipitating factors for each individual should be encouraged.

Integumentary Problems

Many changes occur in the integumentary system with normal aging. These are discussed in Chapter 6. One of the most common problems in the elderly is a skin breakdown due to pressure ulcers. The treatment of pressure ulcers is discussed at length in Chapter 12. Skin cancer and herpes zoster infection (shingles) are also common ailments. These disorders will be briefly addressed here.

Skin Cancers

There are three major types of skin cancer: basal cell, squamous cell, and malignant melanoma (MM). The major risk factor for all types of skin cancer is sun exposure.

Basal cell carcinoma (**Figure 11-14**) is the most common skin cancer, accounting for 65%–85% of cases (Kennedy-Malone, Fletcher, & Plank, 2000). It is often found on the head or face, or other areas exposed to the sun. When treated early, it is easily removed through surgery and not life threatening, though it is often recurring.

Squamous cell carcinoma is more common in African Americans and is also less serious than malignant melanoma. More than 51,000 new MM cases are reported annually to the American Cancer Society (Skin Cancer Foundation, 2005).

Figure 11-14 Basal cell carcinoma.

Source: Leonard Crowley, *Introduction to Human Disease* (6th ed.). Sudbury, MA: Jones and Bartlett Publishers, 2005.

Surgical treatment is required in malignant melanoma (**Figure 11-15**), with chemotherapy and radiation. The prognosis for MM depends on the extent and staging of the tumor, but when

Figure 11-15 Malignant melanoma.

Source: Leonard Crowley, *Introduction to Human Disease* (6th ed.). Sudbury, MA: Jones and Bartlett Publishers, 2005.

caught very early, the cure rate is nearly 100%.

The best treatment for skin cancer in the elderly is prevention. All older persons, especially those with fair skin who are prone to sunburn, should wear sunblock and protective clothing. Annual physical examinations should include inspection of the skin for lesions. Older adults should be taught to report any suspicious areas on their skin to the physician. Persons should particularly look for changes in shape, color, and whether a lesion is raised or bleeds. Most skin cancers, when treated early, have a good prognosis.

Herpes Zoster (Shingles)

Commonly known as shingles, **herpes zoster** is the same virus that causes chicken pox (**Case Study 11-8**). Older persons may be infected with this latent varicella virus after initial exposure to it in the form of chicken pox. The virus then lays dormant in the neurons until it is reactivated, often due to immunosuppression, when it appears in the form of painful vesicles along the sensory nerves. Herpes zoster occurs in both men and women equally, with no specific ethnic variations, but is more common in the elderly.

Case Study 11-8

Eloise Mitchell is a 90-year-old female who lives alone in a senior living apartment. She has three children, none of whom live nearby. Although she has been in good health, Ms. Mitchell has recently experienced weight loss and frequent "colds." She was recently diagnosed with shingles and comes to you, the nurse for the senior living complex, for some help. How would you respond to the following questions from Ms. Mitchell?

Questions:

1. What caused the shingles?
2. The doctor says it's like chicken pox, but I wasn't exposed to that, so how did I get it?
3. Why is there so much pain with this problem? Is there anything I can do to get relief? The medication doesn't help that much.
4. Can I really have sores on the bottom of my feet and in my mouth?
5. How long am I contagious?
6. When will I start to feel better? I had a friend who was under the weather for months! Is that usual?
7. Can I ever get this again? If so, how can I prevent it? It's awful!

Risk factors for developing shingles are age over 55 years, stress, and a suppressed immune system. For many older women particularly, emotional or psychological stress can trigger reactivations. Contrary to the beliefs of some, the virus can recur.

Signs and symptoms of herpes zoster include painful lesions that erupt on the sensory nerve path, usually beginning on the chest or face. These weepy vesicles get pustular and crusty over several days, with healing occurring in 2–4 weeks (Kennedy-Malone, Fletcher, & Plank, 2000). Diagnosis can be made by clinical appearance of the lesions and a history of onset. A scraping will confirm some type of herpes virus. The most common complaint of those with herpes zoster is pain that usually subsides in 3–5 weeks (NINDS, 2005). Postherpetic neuralgia may last 6–12 months after the lesions disappear.

Anitviral medications such as acyclovir are used to treat shingles. Topical ointments may help with pain and itching. Pain medications, particularly acetaminophen, are appropriate for pain management in older adults. Persons with pain that lasts past 6 weeks after the skin lesions are gone and that is described as sharp, burning, or constant require reevaluation by a physician. Postherpetic neuralgia usually disappears within a year (NINDS, 2005).

Nursing interventions for the older adult with shingles are largely to recommend rest and comfort. The patient should be advised that the virus will run its course, but the person is contagious while vesicles are weepy. Persons should not have direct contact (even clothing) with pregnant women, people who have not had chicken pox, other elderly persons, or those with suppressed immune systems. The older person with shingles may experience concerns with pain management and feel a sense of isolation, particularly if they live alone. Arranging for a family member or friend who does not have a high risk of infection to check on the older person at home is advisable.

Endocrine/Metabolic Disorders

Two of the most common disorders in this category among older adults are diabetes and hypothyroidism. These will be discussed in this section.

Diabetes Mellitus

Diabetes mellitus (DM) is a disorder in which the body does not make enough insulin, or cannot effectively use the little insulin that it does produce. There are two major types of diabetes: Type 1 (insulin dependent or IDDM) and Type 2 (non-insulin dependent or NIDDM). Type 1 generally occurs in children and used to be known as juvenile onset diabetes. It is characterized by hyperglycemia and little or no insulin production. Type 2 is seen in the vast majority of those with diabetes and is managed more often by diet, exercise, and oral medications. Type 2 is most common in those over 30 and is characterized by hyperglycemia and insulin resistance.

DM is the seventh leading cause of death among older adults. The risk of diabetes increases with age, as does mortality from this disease. Risk factors include family history, obesity, race (African Americans, Hispanics, Native Americans, Asian Americans, Pacific Islanders), age over 45, hypertension (greater than or equal to 140/90), less "good" cholesterol (less than 35 mg/dl), and a history of large babies (Maschak-Carey, Bourne, & Brown-Gordon, 2002).

About 4.5 million women over the age of 60 have diabetes, but over 1 million of these women

do not know it. Type 2 is the most common type in older women (CDC, 2005). The risk of death from DM is significantly higher among older Mexican American, African American, and Native American women when compared to whites. The Centers for Disease Control (2005) name obesity, weight gain, and physical inactivity as the major risk factors for DM among women.

Early diagnosis is difficult in the elderly, because they may not present with the typical classic symptoms of polydypsia, polyuria, and polyphagia (Amella, 2004). Glucose intolerance may be an initial sign in the elderly; however, diagnosis is made through lab tests and patient history. Due to the increased incidence with age, screening is recommended every 3 years with a fasting blood sugar for those over 45 years of age.

Management is successful when a balance is achieved among exercise, diet, and medications. Medications may be oral hypoglycemics or insulin injection (needed in Type 1). Nurses will need to do a significant amount of teaching (**Tables 11-29 and 11-30**) regarding the signs and symptoms of hyper- and hypoglycemia and the role of medications in managing blood sugar.

Although much of the teaching done with older adults is usually in the acute care hospital or rehabilitation setting, telephone follow-up calls have been shown to improve patient adherence to diet. Additionally, a significant finding of Kim and Oh's research was that patients receiving phone calls from the nurse about adherence to the prescribed regimen for diabetes management showed an improved HbA1c over those who did not have follow-up phone calls (2003).

Thorough evaluation of readiness to learn and of the ability of an older person to manage his or her medications must be done. Older adults who need to give themselves insulin injections may experience anxiety about learning this task. Demonstration, repetition, and practice are good techniques for the older age group. Adaptive devices such as magnifiers may help if the syringes are hard to read. A family member should also be taught to give the insulin to provide support and encouragement, although the older adult should be encouraged to remain independent in this skill if possible. Williams and Bond's research suggested that programs that promote confidence in self-care abilities are likely to be effective for those with diabetes (2002). A plan for times of sickness and the use of a glucometer to monitor blood sugars will also need to be addressed. Additionally,

Table 11-29 The National Diabetes Education Program's Seven Principles for Management

Principle 1: Find out what type of diabetes you have.
Principle 2: Get regular care for your diabetes.
Principle 3: Learn how to control your diabetes.
Principle 4: Treat high blood sugar.
Principle 5: Monitor your blood sugar level.
Principle 6: Prevent and diagnose long-term diabetes problems.
Principle 7: Get checked for long-term problems and treat them.

Source: National Diabetes Education Program, 2005, p. 1.

Table 11-30 KEY AREAS FOR NURSING TEACHING OF OLDER PERSONS WITH DIABETES

- Proper nutrition
- Exercise
- Medications
- Signs and symptoms of hyper- and hypoglycemia
- Meaning of lab tests: FBS, blood glucose, HgbA1c
- Use of a glucometer
- Foot care
- Importance of adherence to therapeutic regimen
- Possible long-term complications
- Prevention of complications
- Plan when sick

the dietician may be consulted to provide education for the patient and family on meal planning, calorie counting, carbohydrate counting, and nutrition. Many patients benefit from weight loss, so the nutritionist can assist with dietary planning in this regard also.

Due to the increased risk of infection and slow healing that result from diabetes, foot care is an essential component in teaching older adults to manage DM. Some experts believe that good preventive foot care would significantly reduce the incidence of amputation in the elderly. Older persons with DM should never go barefoot outside. Extremes in temperature should be avoided. Shoes should be well fitting and not rub. Socks should be changed regularly. Elders should be taught to inspect their feet daily, with a mirror if needed. Corns and ingrown toenails should be inspected and treated by the doctor, not the patient. Older persons should see their physician for a foot inspection at least yearly. Patients should be cautioned that even the smallest foot injury such as a thorn or blister can go unnoticed and unfelt—and often results in partial amputations that lead to a cascade of lower extremity problems.

Complications from DM are many. The most commonly seen in older adults are heart disease, stroke, kidney failure, nerve damage, and visual problems. A key to successful long-term management of diabetes in older adults is prevention of complications. This is best achieved by a careful balance of diet, exercise, and medication. Oral hypoglycemics or insulin help to keep blood sugar under control. The best measure of good blood glucose management and controlled blood sugars is HgbA1c levels (glycosylated hemoglobin). This measure of hemoglobin provides insight into the overall maintenance of acceptable blood sugar levels. If HgbA1c is elevated, it indicates that the blood sugar has been high over time. Treatment is aimed at helping patients to maintain a normal level to decrease risk of complications. There is some controversy that HgbA1c may not be reliable in the elderly. However, Watts et al. (2001) found that HgbA1c was a predictor of foot amputation in patients with diabetes.

Most of the complications of DM seen in the elderly have been discussed elsewhere in this chapter. These include MI, stroke, ESRD, diabetic retinopathy, and PVD. Peripheral neuropathy seen so commonly in older persons with diabetes is most often the result of PVD. Peripheral neuropathy presents as uncomfortable, painful sensations in the legs and feet that are difficult to treat. A lack of sensation may also be present and contribute to the risk of falls. There is no cure for peripheral neuropathy, and it tends to be a complication that patients struggle with continually. A combination of medication to address pain and interventions by a physical therapist seem to be the best current treatment.

Hypothyroidism

Hypothyroidism results from lack of sufficient thyroid hormone being produced by the thyroid gland. Older adults may have subclinical hypothyroidism, in which the TSH (thyroid-stimulating hormone) is elevated and the T4 (thyroxine or thyroid hormone) is normal. In this condition, the body is trying to stimulate production of more thyroid hormone. Some older adults with this condition will progress to have primary or overt hypothyroidism. This is when the TSH is elevated and T4 is decreased. Hashimoto's disease is the most common cause (American Association of Clinical Endocrinologists, 2005), though certain pituitary disorders, medications, and other hormonal imbalances may be causal factors.

Older adults may present an atypical picture, but the most common presenting complaints are fatigue and weakness. Table 11-31 provides additional classic signs and symptoms. Diagnosis should include a thorough history and physical; atrial fibrillation and heart failure are often associated factors. Lab tests should include thyroid and thyroid antibody levels (common to Hashimoto's), and lipids, because hyperlipidemia is also associated with this disorder.

Treatment centers on returning the thyroid hormone level to normal. This is done through oral thyroid replacement medication, usually thyroxine. Whenever a patient is started on this medication, checks should be done at 3, 6, and 12 months to monitor effectiveness and blood levels, because *hyper*thyroidism is a side effect of this therapy and can have serious implications on the older person's health.

Nurses should teach patients about the importance of taking thyroid medication at the same time each day without missing doses. Sometimes older adults have other problems associated with hypothyroidism such as bowel dysfunction and depression. Any signs of complicating factors should be reported to the physician, and doctors' appointments for monitoring should be religiously kept. Strategies for managing fatigue and weakness should also be addressed, because some lifestyle modifications may need to be made as treatment is initiated.

Table 11-31 Signs and Symptoms of Hypothyroidism

*Weakness
*Fatigue
Dry skin
Brittle hair
Hair loss
Weight gain (7–20 pounds)
Cold sensitivity
Puffy face
Headache
Difficulty sleeping
Goiter
Trouble breathing or swallowing
Constipation
Ataxia
Depression
Bradycardia
Anorexia

**Primary signs in the elderly; others may or may not be present*
Source: AACE, 2005; Freil & Cotter, 2002; Reuben et al., 2003.

Other Disorders or Syndromes

There are several notable conditions commonly seen in older adults that may be the result of a variety of factors, not just one physical problem or disease. These include depression, anxiety, delirium, dementia, and insomnia. Depression, anxiety, and insomnia are all discussed at length in

Chapter 12. Dementia of the Alzheimer's type was addressed earlier in this chapter. Delirium and Sundowner's syndrome will be discussed here.

Delirium

Delirium, also called acute confusion, is frequently seen in older adults. It occurs in 22%–38% of older patients in the hospital and in as much as 40% of long-term care residents (Kurlowicz, 2002). Diagnosis is missed in the vast majority of case (Waszynski, 2001). Delirium should be addressed in the elderly, as it is associated with increased length of stay in the hospital and higher mortality rates.

This condition has several distinguishing traits, but especially cognitive-perceptual difficulties and altered level of consciousness. Other characteristics of delirium appear in **Table** 11-32. Delirium is a temporary, reversible condition that may have many different causes, including those listed in **Table** 11-33. Persons' lucidity and confusion may fluctuate hourly but worsen at night. A short attention span, disorganized thinking, and disturbed sleep patterns are also common.

Table 11-32 CHARACTERISTICS OF DELIRIUM IN THE ELDERLY

Abrupt onset
Time limited—generally no longer than 1 month duration
Often associated with a change in environment or unfamiliar surroundings
Often associated with an acute illness
Altered level of consciousness
Fluctuates during the day
Disturbed sleep patterns
Disorientation
Short attention span; easily distracted
Physiological changes
Disorganized thinking
Cognitive-perceptual changes
Impaired memory
Loud or incoherent speech

Table 11-33 POTENTIAL CAUSES OF DELIRIUM

Fluid and electrolyte imbalances
Infection
CHF
Certain medications or polypharmacy
Pain
Impaired cardiac or respiratory function
Emotional stress
Unfamiliar surroundings
Malnutrition
Anemia
Dehydration
Alcoholism
Hypoxia

The symptoms of delirium are disorientation to time and place, altered attention, impaired memory, mood swings, poor judgment, altered level of consciousness, and a decreased **Mini Mental State Examination (MMSE)** score. A score of 23 (out of 30) or less on the MMSE indicates cognitive disturbance. All possible causes should be considered. Delirium symptoms tend to have a sudden onset, but may be associated with any of the causes listed in Table 11-32. The subtypes of delirium are hyperactive, hypoactive, and mixed, indicating that a variety of behaviors may be seen within delirium, from increased activity to lethargy or a combination of both.

Delirium can be detected promptly by a good history and physical examination. MMSEs and geriatric depression screenings are good tools to assist with diagnosis. Lab tests such as a complete blood count, electrolytes, liver and renal function tests, serum calcium and glucose, urinalysis, chest x-rays, ECG, and oxygen satu-

ration will all help determine the underlying cause (Reuben et al., 2004). Resnick (2005) advises nurses to first check for medical causes of delirium such as infection, medications, or change in oxygenation.

The stress of hospitalization may add to the risk of delirium in older adults. Other risk factors for delirium include dementia, advanced age, sleep deprivation, immobility, dehydration, and sensory impairment (Reuben et al., 2004). Kurlowicz (2002) lists common causes in elderly hospitalized patients as medication, pain, dehydration, electrolyte imbalances, and infection.

Treatment of delirium depends on the cause. Symptoms of delirium should not be accepted as normal nor dismissed as a part of old age. Interventions to treat the causal factor should be implemented. For example, if the person is found to have a urinary tract infection, it should be actively treated. If numerous medications may be to blame, the medication regimen must be re-examined. If the person has hypoxia, improved oxygenation is the remedy.

To manage the symptoms of delirium such as confusion, disorientation, and lack of attention while the cause is being addressed, nurses should initiate several measures. First, the person must be kept safe from harm when confused. Having a family member stay at the bedside with the person may be helpful. Reorientation to surroundings, person, time, and place should be consistent and reinforced by all team members. Adequate hydration and nutrition are essential to maintain electrolyte balances. Familiar items such as pictures, favorite blankets, or clothing should be provided for comfort. The environment should be conducive to sleep, and interruptions limited. Cognitively stimulating activities such as reminiscence, word games, or cards should be provided during waking hours. In addition, during the period of delirium, care should be taken to avoid complications, such as the hazards of immobility.

Medications that contribute to the problem should be discontinued or decreased to minimal doses. Low-dose neuroleptics such as haloperidol (Haldol) have been traditionally used to treat delirium, but they have a significant risk for serious side effects. Newer antipsychotics such as risperidone have a lower incidence of side effects and may be a better alternative to Haldol. Other antipsychotics such as chlorpromazine (Thorazine) or thioridazine (Mellaril) should be avoided due to potential cardiac side effects (Reuben et al., 2004).

Generally, delirium should be short in duration, resolving with treatment in a month or less. Early detection and treatment can assist in preventing complications that are often associated with this condition.

Sundowner's Syndrome

Also referred to as sundowning, sundowner's syndrome refers to behavior problems that are sometimes seen, particularly in person's with dementia, in the late afternoon or early evening when the sun sets. This behavior may include disorientation, emotional upset, or confusion. There is no exact explanation as to why this occurs in some older persons, but ideas include the lack of light that contributes to disorientation with their surroundings, boredom at that time of day, or stress (Alzheimer's Association, 2005).

Some suggestions for minimizing the occurrence of this syndrome include keeping the person busy and active during the day to avoid napping so that normal sleep patterns will be maintained. Brisk walks and increased exercise during the day may minimize wandering or walking behaviors at night. Keeping the lights

on in the room to minimize confusion as the sun sets until bedtime is thought helpful by some. Make bedtime a quiet and stress-free experience by eliminating excess noise and providing a routine such as snack and television or reading. Maintaining a calm and pleasant environment while continually reorienting those affected by sundowner's syndrome may minimize the emotional stress experienced by these older persons. Additionally, discuss the possibility of sleeping medications for those who are continually restless at night. Whatever strategies are used to manage behaviors associated with sundowning, the nurse and caregivers should remain calm, reassuring, and flexible while maintaining a safe environment for the older adult.

Critical Thinking Exercises

1. This chapter discusses a great deal of content. Choose one health condition or disease that interests you most and search the Internet site of the organization dedicated to that cause. What resources are available for persons with this problem?
2. Volunteer through your local hospital to help with stroke and/or blood pressure screenings of older adults. Note any common risk factors you observe among the persons that are being screened.
3. Visit a support group related to one of the long-term conditions discussed in this chapter. It might be a stroke survivor's meeting, the breather's club, or the Parkinson's disease group. Listen to the participants and their family members. Write down anything new you learned about how people live and manage with this condition. Talk personally with a family who is living with the condition that you are further investigating.
4. Go to your local mall, church, shopping center, restaurant, or other place where seniors living in the community might gather. Listen to casual conversations between older adults. What types of health problems and concerns do they express?
5. Talk to a nurse who works in the emergency room, or to a local cardiologist. Ask what symptoms they have seen in older adult patients who were diagnosed with myocardial infarction. How are these symptoms different from or similar to a classic presentation?

Personal Reflection

1. Of the disorders presented in this chapter, which are the most familiar to you? Which do you feel you need to do more reading about? Have you ever cared for an older patient with any of these problems? Did the information in the text present what you saw as signs and symptoms in this patient?
2. Which of the diseases in this chapter do you feel are most common in the people you take care of? Are there any ethnic or cultural differences that you have noticed in the geographic area where you work?
3. If an older person came to you and wanted to know about one of the diseases in this chapter, what would you tell them? How is your comfort level with what needs to be taught for each of the disorders in this chapter?
4. Make a list of three diseases that you are least knowledgable about and re-read that section of this chapter. Memorize the signs and symptoms, and think about the nursing interventions you should use.

Glossary

Activities of daily living (ADLs): Include activities such as dressing, grooming, eating, toileting, and oral-facial hygiene

Age-related macular degeneration (ARMD): A condition associated with aging in which the macula of the eye deteriorates, causing loss of central vision

Alzheimer's disease (AD): A terminal neurological disorder characterized by deterioration of the brain leading to progressive forgetfulness and loss of independence

Angina: Chest pain resulting from lack of oxygen to the heart muscle

Atherosclerosis: Hardening and narrowing of the arteries to the heart from plaque build-up in vessel walls

Benign paroxysmal positional vertigo (BPPV): One of the more common and treatable causes of dizziness in older adults resulting from otoconia being displaced in the ear canal

Benign prostatic hyperplasia (BPH): Enlargement of the prostate gland that often occurs with advanced age

Bone mineral density (BMD): Screening test for osteoporosis

Cardiovascular disease (CVD): Includes hypertension, coronary heart disease, congestive heart failure, and stroke

Cataracts: Clouding of the lens

Cerebrovascular accident (CVA): Stroke; brain attack

Chronic bronchitis: A type of COPD characterized by increased mucus production and scarring of bronchial tubes that obstructs airflow

Chronic obstructive pulmonary disease (COPD): A group of diseases related to obstructed airflow in the lungs

Congestive heart failure (CHF): A chronic deficiency in the heart's ability to pump blood to the body

Continuous bladder irrigation (CBI): Used after a TURP to flush the bladder

Corneal ulcers: Irritation of the cornea that may be caused by stroke, infection, fever, or trauma, and often results in scarring

Coronary artery disease (CAD): Also called coronary heart disease or ischemic heart disease; results from atherosclerosis

Coronary heart disease (CHD): Includes myocardial infarction, angina, and other conditions

Cystectomy: Surgical removal of the bladder

Delirium: Acute confusion characterized by cognitive perceptual disturbances of short duration

Detrusor: The bladder muscle

Diabetic retinopathy: Impaired vision due to bleeding in the retina from ruptured vessels

Diverticulitis: Inflammation of the intestinal diverticuli

Dysphagia: Difficulty with eating or swallowing

Emphysema: A type of COPD that causes irreversible lung damage and results in decreased gas exchange at the alveolar level related to loss of elasticity

Erectile dysfunction (ED): Impotence

Functional incontinence: Loss of urine from environmental or physical factors, which interferes with ability to get to the bathroom in time

Gastroesophageal reflux disease (GERD): When gastric acid and/or stomach contents come up into the esophagus

Glaucoma: A group of degenerative eye diseases whereby vision is damaged by high intraocular pressure

Gonioscopy: Tool to directly examine the eye

Helicobacter pylori: A common bacterial contributor to symptoms

Hemiparesis: Weakness of one side of the body

Hemiplegia: Paralysis of one side of the body

Herpes zoster: The virus that causes chicken pox and shingles

Histamine 2 (H_2) blockers: Medications used for the treatment of GERD

Hypertension: Currently defined as a consistently elevated reading of 140/90 mm Hg.

Incontinence: Involuntary loss of stool or urine

Instrumental activities of daily living (IADLs): Include such activities as shopping, using the telephone, and balancing the checkbook

Intraocular pressure (IOP): The amount of pressure inside the eye; normal is 9–21 mm HG

Kegel exercises: Tightening and relaxing of pelvic floor muscles; used to help prevent incontinence

Mauk model for poststroke recovery: A theoretical model derived using grounded theory methods that suggests a common process for stroke recovery and rehabilitation

Meniere's syndrome: A common cause of vertigo in the elderly characterized by dizziness and tinnitus

Myocardial infarction (MI): Heart attack

Mixed incontinence: A loss of urine resulting from a combination of other types of incontinence

Mini Mental State Examination (MMSE): A brief series of questions to help determine the presence of cognitive impairment

Osteoporosis: Demineralization of the bones; decreased bone density

Otoconia: "Stones" in the ear canal that affect balance

Overflow incontinence: Leakage of urine from spillage due to a full bladder that does not empty on its own

Parkinson's disease (PD): A neurological disorder characterized by lack of dopamine in the brain secondary to loss of neurons in the basal ganglia

Peripheral artery disease (PAD): A problem with blood flow in the arteries due to blockage or narrowing

Peripheral vascular disease (PVD): The most common form of peripheral artery disease

Phantom limb pain: Pain in an absent/amputated extremity

Proliferative retinopathy: The fourth and most advanced stage of diabetic retinopathy in which abnormal and fragile vessels develop to compensate for blocked blood flow to the retina; this leads to visual disturbances and often blindness

Prostate specific antigen (PSA): A screening test for prostate cancer

Radical prostatectomy: Surgical removal of the prostate as a treatment for cancer

Reflex incontinence: Involuntary loss of urine from reflex activation

Retinal detachment: Situation in which the retina becomes displaced due to trauma or illness and requires immediate medical attention to restore vision

Scatter laser treatment: Treatment for diabetic retinopathy in which a laser burns abnormal vessels away from the retina to reduce further vision loss

Stress incontinence: Loss of urine related to the inability of the urinary sphincters to withstand an increase in intrabdominal pressure such as occurs with laughing, sneezing, or coughing

Stroke: An interruption of the blood supply to the brain

Tinnitus: Ringing in the ears

Tonometer: An instrument used to measure intraocular pressure

t-PA (tissue plasminogen activator): Used to treat acute ischemic stroke

Transient ischemic attack (TIA): Stroke symptoms that last from minutes to less than 24 hours with no residual effects

Transurethral resection of the prostate (TURP): Surgical intervention for BPH

Tuberculosis (TB): Disease caused by mycobacterium tuberculosis; can affect any body part, but particularly the lungs

Urge incontinence: Loss of urine resulting from a need to void that comes on suddenly

Urostomy: Stoma through which urine passes into a receptacle on the outside of the body; used when the bladder has been removed

Vitrectomy: Evacuation of the vitreous humor in order to remove blood that has leaked from damaged vessels in diabetic retinopathy

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Chapter 12

Management of Common Problems

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LEARNING OBJECTIVES

At the end of this chapter, the reader will be able to:

1. Describe the demographics of medication use in the elderly and the possible consequences of polypharmacy in the older adult.
2. Identify physiologic changes of aging and their effects on pharmacokinetics (drug absorption, distribution, metabolism, and excretion) and pharmacodynamics.
3. Discuss strategies for minimizing adverse consequences of polypharmacy and enhancing medication adherence.
4. Develop an understanding of the complex cost issues related to medications for older adults.
5. Describe the demographics and identify risk factors for falls in the elderly.
6. List components in the evaluation of a fall and identify interventions for fall prevention in the elderly.
7. Differentiate between the myths and facts related to restraint use in the elderly.
8. Develop a plan to prevent falls and injuries utilizing nonrestraint interventions.
9. Understand the effects of and assess and manage problems of depression and anxiety in the older adult.
10. Collect the appropriate data related to a patient's urine control and plan nursing care accordingly.
11. Initiate behavioral interventions to treat UI and promote continence for those at risk for UI.

12. Understand the effects of and assess and manage sleep disturbances in the older adult.
13. Identify and manage pressure ulcers.
14. Develop a skin management protocol to prevent pressure ulcers.
15. Assess for dysphagia at the bedside.
16. Develop a plan to meet nutritional and hydration needs of a patient with dysphagia.

KEY TERMS

- Adverse drug reaction (ADR)
- Bladder diary
- Bladder training
- Braden Scale for Pressure Ulcer Risk Assessment
- Chemical restraint
- Deglutition
- Delirium
- Dementia
- Dependent continence
- Depression
- Drug–drug interaction
- Dysphagia
- Established incontinence
- Extrinsic risk factor for falls
- Fall
- Functional urinary incontinence
- Generalized anxiety disorder (GAD)
- Independent continence
- Insomnia
- Intrinsic risk factors for falls
- Medication error
- Mixed urinary incontinence
- Nocturia
- Nonadherance
- Nonrapid eye movement (NREM) sleep
- Overflow urinary incontinence
- Panic disorder
- Partial continence
- Pelvic muscle rehabilitation
- Pharmacodynamics
- Pharmacokinetics
- Physical restraint
- Polypharmacy
- Pressure ulcer
- Pressure Ulcer Scale for Healing (PUSH)
- Prompted voiding (PV)
- Rapid eye movement (REM) sleep
- Recurrent falls
- Restless leg syndrome
- Sleep apnea
- Social continence
- Stress urinary incontinence
- Transient incontinence
- Urge suppression techniques
- Urge urinary incontinence
- Urinary incontinence (UI)

As the aging population grows, so must nursing's ability to provide care that addresses the unique health care needs and characteristics of older adults. Differentiating disease from normal changes with aging and the early recognition of indicators of underlying health problems allow the early initiation of treatment while recovery is still possible (Amella, 2004). The professional nurse's ability to successfully identify, evaluate, and treat the chronic conditions that hallmark impending illness or impair function is essential to promoting the quantity and quality of life. In this chapter, we will present the diagnoses and treatments of multifactorial conditions that may indicate the onset of illness or result in a decline in functioning, including falls, delirium and confusion, anxiety, depression, urinary incontinence, sleep disorders, pressure ulcers, and dysphagia. Also, we will pay special attention to the problem of polypharmacy, a key causative and contributory factor for many common health problems.

Polypharmacy

Older adults take considerably more medications than younger people. Despite the fact that older adults constitute only 12.7% of the U.S. population, they consume 34% of all prescription medications and 40% of all nonprescription medications (American Society of Consultant Pharmacists, 2000). It is estimated that older adults living outside skilled nursing facilities take an average of four to five medications per day; those who are institutionalized average six to eight medications per day (McCrea, Ranelli, & Boyce, 1993). The act of taking many medications concurrently is termed **polypharmacy**. The American Nurses Association *Position Statement* (1990) defines polypharmacy as the "concurrent use of several drugs."

Implications of Polypharmacy

The consequences of polypharmacy in the older adult range from mildly annoying to life threatening. Multiple medication regimens are often perceived as complicated and expensive, resulting in **nonadherence** to the prescribed therapy. Nonadherence is defined as the extent to which patients are not willing to follow the instructions they are given for prescribed treatments. Additionally, other age-related disabilities may hamper adherence, such as visual/hearing impairments, impaired memory or cognition, or arthritis. Polypharmacy and older age are the two most significant predictors of nonadherence (Bedell, Cohen, & Sullivan, 2000).

In addition to nonadherence, polypharmacy may result in a higher incidence of **adverse drug reactions (ADRs)**. An ADR is a detrimental response to a given medication that is undesired, unintended, or unexpected in recommended doses. More than one third of ADRs involve older persons, and an estimated 95% of those are predictable and preventable (American Society of Consultant Pharmacists, 2000). Once an ADR occurs in an older person, a higher level of care is usually required to treat the adverse event. ADRs have been shown to increase the risk of mortality and nursing home placement in the geriatric population. Clinical manifestations of ADRs may include varying degrees of nausea, constipation, gastrointestinal bleeding,

Box 12-1

Any symptom in the older adult should be considered an ADR until proven otherwise (Avorn & Gurwitz, 1997).

urinary incontinence, muscle aches, sexual dysfunction, insomnia, confusion, dizziness, orthostatic hypotension, and falls (Golden, Silverman, & Preston, 2000).

There is an increased incidence of **drug–drug interactions** in a patient experiencing polypharmacy. A drug–drug interaction may occur when two or more drugs are taken concurrently. As the number of medications taken increases, so does the risk for a drug–drug interaction. For example, a patient receiving two different medications has approximately a 6% chance of experiencing an interaction. A patient taking five medications has a 50% chance of an interaction. Finally, this chance rises to nearly 100% if he or she is taking eight medications (Jones, 1997). As with ADRs, more care is usually required to treat these drug–drug interactions in the elderly.

An elderly person experiencing polypharmacy is more susceptible to **medication errors**, defined as taking the wrong medication or the wrong dose at the wrong time or for the wrong purpose. The incidence of errors in medication administration is increasing—deaths attributed to medication errors rose from 198,000 in 1995 to 218,000 in 2000 (Ernst & Grizzle, 2001).

Hospitalization as a consequence of polypharmacy is more prevalent in older adults. Twenty-eight percent of hospitalizations of elderly are a result of ADRs and nonadherence alone. Related complications that result in hospitalization include electrolyte imbalances, gastrointestinal bleeding, and hip fractures associated with falls. The older patient admitted to the hospital and taking three or more medications for chronic conditions has a 33% chance of being readmitted within a month of discharge (American Society of Consultant Pharmacists, 2000).

With the growing concern surrounding identification and prevention of polypharmacy, the nurse needs to be vigilant of the potential underutilization of some drug therapies in the older adult as well. A number of studies have illustrated the hazards of underprescribing medications, for instance, beta blockers after acute myocardial infarction (Gottlieb, McCarter, & Vogel, 1998), hormone replacement therapy for osteoporosis prevention (Handa, Landerman, & Hanlon, 1996), or antihypertensive drug therapies (Berlowitz, Ash, & Hickey, 1998). Cleeland, Gonin, and Hatfield (1994) demonstrated the amount of opioid analgesia administered to an older person in pain was consistently less than the amount given to younger adults. Withholding therapy based on advanced age may result in increased morbidity and mortality, and reduced quality of life. Unrelieved pain in the elderly can result in decreased cough, decreased gastrointestinal motility, an increase in negative feelings, a preoccupation with the pain, and a longer hospital stay (McCaffery & Pasero, 1999).

Polypharmacy-associated nonadherence, ADRs, drug–drug interactions, and increased incidence of hospitalizations undoubtedly contribute to increased health care costs, both indirectly and directly. Indirect costs are incurred as a result of treating these consequences of polypharmacy. Direct costs stem from the patient literally spending more to obtain the medications. Health care costs in general are rapidly on the rise. In particular, the single leading component of health care expenditure is the cost of prescription drugs. Currently, prescription drugs account for 10% of total health care spending; they are projected to account for 18% in 2008 (Ganguli, 2003). The AARP Public Policy Institute (2004) compared prescription drug prices commonly used by the elderly population between 2000

Box 12-2

An AARP survey (2004) reported that 71% of older adults found paying for prescriptions to be problematic. For more information on medication use in the elderly, see www.aarp.org/ppi/.

and 2003 and found that the average annual rate of increase in manufacturer list price far exceeded the rate of general inflation during that same time frame.

Even though Medicare covers virtually all adults aged 65 and older, its standard benefit package no longer pays for outpatient medications. A variety of supplementary insurance options are available to the elderly on an individual basis that may provide additional coverage of prescription medicine; however, even with these options, it is estimated that one third of the beneficiaries have no prescription drug coverage at all (Klein, Turvey, & Wallace, 2004). This translates into many patients paying hundreds of dollars out-of-pocket per month for medications they literally cannot live without. Despite potentially severe consequences, some older adults are choosing to forego prescription medications recommended to them. Mojtabai and Olfson (2003) found that in a 2-year period more than 2 million elderly Medicare beneficiaries did not adhere to drug treatment regimens because of cost. Nonadherence with drug therapy tended to be more common among beneficiaries with no or partial medication coverage and was associated with poorer health and higher rates of hospitalization. Clearly, the high cost of medications is taking its toll on the elderly.

Risk Factors for Polypharmacy

There are a number of reasons why the elderly in particular are predisposed to polypharmacy. Older people often have a myriad of chronic comorbidities (chronic illnesses) requiring medications. Cardiovascular disease and diabetes are just two examples of illnesses that may require a multidrug regimen. In addition, many elderly have their care provided by specialty physicians who may be unaware of the medications prescribed by other health care providers. Often there is little or no communication occurring between health care providers, and patients are getting duplicate and unnecessary medications. There are also health care providers who simply write a prescription because that is what the provider thinks the patient wants. It has been estimated that 75% of all visits to a physician result in a written prescription (Larson & Martin, 1999). At other times, a health care provider may unwittingly get caught up in the "prescribing cascade." For example, an elderly patient taking codeine for moderate pain may experience constipation and nausea. If the prescriber adds a phenothiazine (an antiemetic) and a laxative, the patient may become excessively sedated and experience loose stool that may result in fecal incontinence. Consequently, medications may be ordered to treat those symptoms, and so on. Treating adverse drug reactions with more medication will in turn potentiate the possibility of yet more adverse reactions. Tamblyn, McCleod, Abrahamowicz, and Laprise (1996) report that adverse drug reactions are treated with another drug in 80% of visits to the physician.

The consequences of polypharmacy in the elderly are complicated by age-related changes in the body that result in altered **pharmacokinetics**

and **pharmacodynamics**. Pharmacokinetics refers to the absorption, distribution, metabolism, and excretion of a given drug, or "what the body does to the drug." Pharmacodynamics refers to the biochemical or physiological interactions of drugs, or "what the drug does to the body." The physiological responses to medications are often altered in the older person. The responses to some medications are exaggerated; however, the responses to other medications are often suppressed. See **Table 12-1** for a more detailed description of these age-related changes and their clinical significance.

Recognizing that some medications should be avoided in the elderly because their potential risks outweigh their potential benefits, experts in geriatric medicine and pharmacy have developed explicit criteria for inappropriate drug use in nursing home patients (Beers et al., 1991). These criteria identify medications likely to create problems in the elderly and were developed to predict when the potential for adverse outcomes is greater than the potential for benefit. Beers (1997) updated the original criteria to include elderly patients in all settings (outpatient, inpatient, and nursing homes). Medications with high potential for serious adverse outcomes in the elderly are many, and are described in Chapter 8. The nurse, primary care provider, and pharmacist should refer to the list in Table 8-1 when considering medication administration in the elderly.

Interventions/Strategies for Care

Nurses play a key role in effective drug therapy. There are a number of strategies the nurse can implement to enhance medication adherence, minimize adverse consequences of polypharmacy, and in turn improve patient outcomes.

The nurse should be knowledgeable about drug therapy in the elderly *and* the medications the individual patient is taking. Becoming familiar with the medications that have been identified as problematic for the elderly is a good starting point. When medications are being administered that have a high potential for adverse reactions, the nurse should be vigilant about monitoring for adverse effects as well as evaluating the therapeutic effect.

To obtain a comprehensive medication profile when gathering a history, in addition to asking the name, purpose, dose, and administration parameters for each medication taken, also ask the following:

- Do you use OTC medications, including vitamins, dietary supplements, or herbal preparations?
- How many alcoholic beverages do you drink a week?
- Do you ever borrow medications?
- How many health care providers are involved in your care?
- Do you request refills without seeing your health care provider?
- Do you have prescription medications from more than one health care provider?
- Do you have prescriptions filled at more than one pharmacy?
- Do you have any vision or hearing problems?

Monitor the patient's serum blood urea nitrogen (BUN) and creatinine because the excretion of most drugs depends on adequately functioning kidneys. However, keep in mind that because lean body mass decreases with advancing age, the serum creatinine level tends to overestimate the older adult's ability to excrete a particular medication. A more accurate measure of renal excretion is the creatinine clearance

Table 12-1 Age-related Changes Affecting Pharmacokinetics and Pharmacodynamics

Pharmacokinetics	Physiologic Change	Clinical Significance
Absorption	No significant changes in gastric pH; decreased absorptive surface and splanchnic blood flow	Little significance; possibly delayed onset of action and peak effect of medications
Distribution	Increased body fat	Increased volume of distribution of lipid-soluble drugs (e.g., benzodiazepines, barbiturates, phenothiazines, and phenytoin [Dilantin], resulting in prolonged half-life
	Decreased water compartment	Higher levels of water-soluble drugs (e.g., digoxin and theophylline), increasing risk for toxicity
	Decreased lean body mass	Because creatinine is formed from muscle mass and muscle mass decreases with age, serum creatinine normally decreases with age; therefore, a serum creatinine level of $\leq$ 1.2 mg/dl could erroneously be perceived as WNL when in fact renal impairment exists; urine creatinine clearance is a better indicator of renal function in the elderly
	Decreased serum albumin	Risk for toxicity of highly protein-bound drugs due to more free drug circulating
Metabolism	Decreased liver mass and hepatic blood flow	Slowed metabolism, increasing half-life
Excretion	Creatinine clearance reduced	Less efficiently excreted drugs, increasing half-life
Pharmacodynamics	Variable receptor response	Increased response with some drugs (e.g., opiates and benzodiazepines) and decreased response with others (e.g., beta agonists and antagonists)

Source: Dharmarajan & Tota, 2000.

(CrCl). Creatinine clearance measures the glomerular filtration rate (GFR), which is the number of milliliters of filtrate made by the kidneys per minute. Normal CrCl in males is 107–139 ml/min (or 1.78–2.32 ml/s) and in females is 87–107 ml/min (or 1.45–1.78 ml/s). Values decrease 6.5 ml/min/decade of life because of decreased GFR (Pagana & Pagana, 2005). The Cockroft-Gault (1976) formula should be used to estimate creatinine clearance in older adults. (See **Box 12-3**).

In comparing and contrasting serum creatinine and CrCl, consider two men with a serum creatinine of 1 mg per dl who both weigh 72 kg (158.4 lb). The first man is 25 years old and the second man is 85 years old. Even though their serum creatinine is the same, their CrCl is significantly different. The younger man's estimated creatinine clearance is 115 ml per minute (1.92 ml per second), whereas the older man's would be 55 ml per minute (0.92 ml per second). This difference is especially important with drugs that have a narrow therapeutic index and significant renal excretion.

In addition to monitoring renal function, the nurse should monitor the patient's liver function tests (LFT), aspartate aminotransferase/AST (normal = 0–35 units/l), alanine aminotransferase/ALT (normal = 4–36 units/l), alkaline phosphatase/ALP (normal = 30–120 units/l), and bilirubin (normal = 0.3–1.0 mg/dl). An elevation in LFTs could result in a prolonged half-life of the medication because it is cleared very slowly from the body. As a result, toxicity is a possible outcome of impaired liver metabolism.

Maintain a high index of suspicion. When a patient acquires new symptoms, consider the possibility of an ADR until proven otherwise. An alteration in thought processes or behavior (restlessness, irritability, and confusion) may be the first sign of drug toxicity.

Take measures to help simplify and streamline a medication regimen. Use doses with once daily or twice daily dosing, because the less frequent the dosing, the higher the probability of adherence. Avoid alternate day therapy when possible because this can be confusing to the patient. Review regimens regularly and revise as needed, based on patient compliance, satisfaction, and response to the regimen.

Always consider nonpharmacologic approaches (e.g., lifestyle modification) instead of or in addition to drug treatment. For instance,

Box 12-3 The Cockroft-Gault Formula for CrCL

$$\frac{140 - \text{age (years)} \times \text{weight (kg)}}{72 \times \text{serum creatinine (mg/dl)}}$$

*Note: Multiply by 0.85 for females.

Box 12-4

KEY POINT: Start low and go slow with new medications.

When initiating pharmacological treatment for chronic or mild disorders in the elderly, the starting dose should be a lower, effective dose. If after a predetermined amount of time this dose is not adequate to produce the desired effect, then the dose should be increased slowly until the therapeutic effect is achieved.

constipation can often be successfully managed with diet and fluid intake rather than laxatives and stool softeners. There is a growing body of evidence identifying effective behavioral interventions to promote continence, safety, relaxation, and sleep. Nonpharmacologic approaches to the treatment of the common health care problems addressed in this chapter are identified and explained in each section.

Ensure that the patient/caregiver is an informed consumer. Encourage the patient and/or caregiver to learn about the medications they are taking. Advise them to ask questions and read package inserts so they will know the desired therapeutic effects as well as potential ADRs, the correct way to take the medication properly, and potential drug–drug and drug–diet interactions. Suggest that they consider all new medications as trial therapy until the patient and the health care provider determine that they work safely and are effective. Recognize that new symptoms may not be from old age, but from the drugs being taken.

Instruct the patient to obtain all medications (prescription and nonprescription) at one pharmacy so pharmacists can check for potentially dangerous interactions. The pharmacist can serve as the central figure who maintains a list of medications and screens for drug–drug interactions to avoid harmful situations. Encourage the patient or caregiver to know the pharmacist on a first-name basis! Explain that patients should "brown bag" medications (including prescription and nonprescription medicines, vitamins, and herbal supplements) with every office visit, so the health care provider can review and document medications taken. Suggest the patient invent a system to remember to take medications. Use meals or bedtime as cues for remembering. Drug-taking routines should take into account whether the medicine works better on an empty or a full stomach. Consider using pill boxes, schedules, and/or calendars.

If there are no children or cognitively impaired individuals in the household, the nurse may suggest easy-to-open (nonchildproof) containers. Nonchildproof lids must be requested. Encourage the older person to ask for large type labels or to use a magnifying glass under a bright light to read labels. Large print written instructions should also be requested when needed. Discourage pill sharing and pill hoarding. Medication cabinets should be checked at least annually for outdated medications and medications no longer needed. A home health nurse, family member, or friend may be enlisted to assist the older person with this safety check.

A number of strategies are available to help the patient stretch his or her prescription dollars. When a new prescription is ordered, suggest the patient ask for free drug samples from the physician. If the patient develops undesirable side effects from the medication and has to switch, he or she won't be stuck with a costly bottle of medicine. Encourage the patient to ask for a senior citizen discount at the pharmacy. Generic equivalents and store or discount brand products save money. Be sure the patient understands his or her current drug coverage. Health benefit information can be very confusing.

Resources

The passage of the Medicare Prescription Drug, Improvement, and Modernization Act of 2003 has recently changed prescription medication accessibility for the elderly. Beginning June 2004 through 2005, a prescription discount card has been made available to eligible beneficiaries. The card yields a potential average savings of between 10% and 25% per prescription.

In 2006, a full-scale drug benefit replaces the prescription discount card. It will allow beneficiaries to voluntarily sign up with a private plan that offers drug coverage, or sign up for a standalone drug benefit. This drug coverage will be subject to a monthly premium, estimated to average $35 in the first year. A $250 annual deductible is also planned. Medicare will cover three-quarters of the drug costs between $250 and $2,250 until they reach $3,600 in out-of-pocket spending. Once this threshold is reached, Medicare will pay all costs except for nominal cost sharing of 5% (Klein et al., 2004). This plan is described on the government's Web site at http://www.medicare.gov/medicarereform/108s1013.pdf.

Another option for the elderly in financial need is to consider a medication assistance program (MAP). Typically sponsored by pharmaceutical companies, a MAP provides a particular brand of medication at little or no cost to patients who meet certain financial criteria and do not have insurance coverage for prescription drugs. Fifty-three percent of the top 200 medications prescribed in 1999 were offered through MAPs to patients who qualified (Miller, 2002). Even though most MAPs require some physician involvement in the application process, nurses can act as advocates to initiate the referral. An Internet site that serves as a "yellow pages" for these MAPs is www.needymeds.com.

In response to the high cost of prescription medications in this country, some people have opted to obtain medications from mail order pharmacies. These pharmacies may be out of state or outside the United States. Depending on the prescription, medications can be bought for a fraction of the cost of purchasing them at the local pharmacy. Critics argue that the lack of regulatory standards puts consumers at risk. At time of print, a bipartisan bill has been proposed that would legalize the safe importation of prescription drugs, beginning with Canada. The AARP states, "though not a final solution to the problem of high drug cost, the safe importation of prescription drugs will help put downward pressure on prices and help individuals secure a degree of savings." (2004, p. 3).

The use of multiple drugs is indicated and appropriate for some medical conditions. However, in the older adult, where it is most prevalent, polypharmacy can cause more harm than good. The nurse plays a key role in making sure the older adult gets the most from his or her drug therapy. It is the nurse's responsibility to be knowledgeable about the medications administered, to astutely assess the patient's response to the drug therapy, and to educate the patient about his or her medication regimen. Nursing intervention can prevent or minimize many of the multiple complications of polypharmacy, such as falls.

Falls

A **fall** is defined as "an event which results in a person unintentionally coming to rest on the ground or another lower level; not as a result of a major intrinsic event (such as a stroke) or overwhelming hazard" (Tinetti, Speechley, & Ginter, 1988, p. 1703). For millions of older Americans, falls present a serious health risk. More than one third of adults ages 65 years and older fall each year (Hausdorff, 2001).

Implications of Falls

Falls can result in injury, loss of independence, reduced quality of life, and death in the elderly. Fractures are the most serious health consequence of falls. Of those who fall, 20%–30%

Box 12-5

In 2001, more than 1.6 million seniors were treated in emergency departments for fall-related injuries and nearly 388,000 were hospitalized (Senior Falls Toolkit, 2005).

suffer moderate to severe injuries such as hip fractures or hip traumas. Eighty-seven percent of all fractures among older adults are due to falls. The most common fractures are of the vertebrae, hip, forearm, leg, ankle, pelvis, upper arm, and hand (Scott, 1990). At least 50% of elderly persons who were ambulatory before fracturing a hip do not recover their prefracture level of mobility (Beers & Berkow, 2005).

In addition to fractures, over 50% of falls among elderly persons result in at least some minor injury such as lacerations and bruises (Beers & Berkow, 2005). Quality of life may deteriorate drastically after a fall. If the elderly person remains on the floor for a time after a fall, dehydration, pressure sores, rhabdomyolysis, hypothermia, and pneumonia may result. Elderly persons who fall, particularly those who fall repeatedly, tend to have deficits in activities of daily living and are at high risk of subsequent hospitalization, further disability, institutionalization, and death. Fall-related injuries account for about 5% of hospitalizations in patients 65 years of age or older. About 5% of elderly persons with hip fractures die while hospitalized; overall mortality in the 12 months after a hip fracture ranges from 12% to 67% (Beers & Berkow, 2005). In 2001, more than 11,600 people age 65 and older died from fall-related injuries (Senior Falls Toolkit, 2005). The total cost of all fall injuries for people age 65 or older in 1994 was $27.3 billion. By 2020, the cost of fall injuries is expected to reach $43.8 billion (Englander, Hodson, & Terregrossa, 1996).

Falls that do not result in injury may still have serious consequences. Elderly persons may fear falling again, which can lead to reduced mobility. This reduced mobility can lead to decreased activity, decreased independence, and an increased dependence on others. In addition, decreased activity can increase joint stiffness and weakness, further compromising mobility. Falls are reported to be a contributing factor in 40% of nursing home admissions (Beers & Berkow, 2005).

Risk Factors for Falls

Nurses routinely assess patients and their environment and are instrumental in implementing interventions to prevent falls. In order to accurately assess risk for falls, a comprehensive knowledge of factors that contribute to a fall is essential. Risk factors for falls can be categorized into **intrinsic** and **extrinsic factors**. Intrinsic factors relate to the changes associated with aging and with disorders of physical functions needed to maintain balance. These functions include vestibular, proprioceptive, and visual function, as well as cognition and musculoskeletal function (see Table 12-2). Elderly persons who fall in institutions are usually more physically and/or cognitively impaired, and therefore intrinsic factors contribute most to falls and fall-related injuries. In institutionalized patients, the use of restraints and bed rails may increase the risk of falls because patients attempt to free themselves from these constraints. Extrinsic factors are related to environmental hazards and challenges such as poor lighting, stairs, clutter, and throw rugs. Extrin-

Table 12-2 Risk Factors for Falls

Intrinsic Factors	Extrinsic Factors
Cognitive impairment	Poor lighting
Medication/alcohol	Poor color distinction
Impaired mobility	Cluttered environment
Fall history	Unfamiliar environment
Acute or chronic illness	Stairs
Elimination problems	Throw rugs
Sensory defects	Unsuitable footwear
Frailty	Restraints
Postural hypotension	Siderails

sic factors are implicated in up to 50% of all falls in the elderly in community settings (Beers & Berkow, 2005).

Among the elderly living in the community, most falls occur during usual activities such as walking. Indoor falls occur most often in the bathroom, bedroom, and kitchen. About 10% of falls occur on stairs, with descent being more hazardous than ascent. The first and last steps are the most dangerous. Common sites of outdoor falls are curbs and steps. In institutions, the most common sites of falls are the bedside (during transfers into or out of bed) and the bathroom (Beers & Berkow, 2005). The use of drugs is a major risk factor for falls; the risk of falling increases with the number of prescribed drugs. Psychoactive drugs are the drugs most commonly reported as increasing the risk of falls and hip fractures. Other medications that contribute to falls include analgesics, psychoactive drugs, antihypertensives, diuretics, aminoglycosides, and phenothiazines (Beers & Berkow, 2005).

Fall Assessment

Elderly persons admitted to acute care, rehabilitation, or long-term care settings should have an initial fall risk assessment on admission and at regular intervals throughout their stay. There are a number of fall assessment tools available to assess inpatient risk of falls, but no single tool has been adopted universally. Most tools contain a fall history, an examination of mental and mobility status, a checklist for the presence of sensory deficits, a list of medications the client is receiving, and a list of primary and secondary diagnoses. A fall assessment tool is depicted in **Figure 12-1**. To be effective, a fall assessment tool must be short, individualized to the patient, applicable to the setting, readily available to the staff, and have demonstrated validity and reliability. Most important, it must also be followed by individualized interventions to prevent falls specific to the patient. Fall prevention strategies are likely to be more effective if they include a multidisciplinary approach to the process.

In the community setting, elderly patients with known risk for falling should be questioned about falls as part of all their routine screenings. This is necessary because many elderly persons fear being institutionalized and are unlikely to voluntarily admit falling unless they have sustained an injury for which they need medical care. A fall may be an isolated event or recurrent. A **recurrent fall** is defined as more than two falls in a 6-month period (Fuller, 2000). All falls should be carefully evaluated for the underlying cause, but the incidence of recurrent falls is a significant risk factor for serious injury. The person should be asked to describe the circumstances surrounding the fall, such as what activity they were engaged in, the location of the fall, witnesses to the fall, and

Figure 12-1 Morse Fall Scale.

Criteria:	Circle No/Yes	Score	Patient Score
1. Patient has a history of falling.	No	0	
	Yes	25	
2. Patient has a secondary diagnosis.	No	0	
	Yes	15	
3. Patient uses ambulatory aid:			
None/bedrest/nurse assistant	Yes	0	
Crutch/cane/walker	Yes	15	
Holds on to furniture	Yes	30	
4. Patient is receiving:			
Intravenous therapy/heparin lock	No	0	
	Yes	20	
5. Patient's gait is:			
Normal/bedrest/wheelchair	Yes	0	
Weak	Yes	10	
Impaired	Yes	20	
6. Patient's mental status is:			
Oriented toward own ability	Yes	0	
Overestimates/forgets limitations	Yes	15	
		Total Patient Score:	

Assess the patient for each criterion identified on the scale; circle "No" if the criterion is not present and "Yes" if the criteria is present. Translate the no/yes score into a numerical score and place this number under Patient Score. The score will range from 0 to 125. A patient who scores ⩾25 is at high risk and should have fall prevention strategies in place.

Source: University of Iowa EBP on fall prevention.

injuries sustained. The nurse should perform a physical assessment to determine the cause and contributing factors (**see Table 12-3**).

A home visit is important in identifying extrinsic risk factors and planning and implementing appropriate interventions. Home evaluations may be part of discharge planning from an institution or conducted during home health visits. A home safety checklist should be used to ensure a thorough evaluation. Important components of a home evaluation are outlined in **Figure 12-2**.

Interventions/Strategies for Fall Prevention

Not all falls can be prevented, but by identifying risk factors and implementing appropriate interventions nurses can play a vital role in preventing falls or minimizing injury. There are a number of strategies for creating a milieu that reduces the risk of falls. Some of the more successful strategies follow.

Modify the Environment

In the inpatient setting, orientation to the environment with an emphasis on safety devices is the first step in preventing falls. Other strategies include nonskid slippers or shoes, removal of obstacles and clutter, having the commode close to the bed, having the call light within easy access, and encouraging use of glasses and hearing aids. The avoidance of physical restraints, such as raised side rails, and maintaining the bed in the lowest position are essential in reducing the severity of falls. Side rails are a common physical restraint that are used to prevent falls but often result in more serious injury because patients attempt to climb over them and may fall from a greater height (O'Keefe, Jack, & Lye, 1996).

Similar interventions applicable to the community setting include removing clutter, throw rugs, and cords and wires; installing handrails on stairs, bathtubs, and showers; using rubber bath mats in the shower and tub; installing

Table 12-3 Components of a Physical Assessment to Identify Intrinsic Risk Factors for Falls

Physical Assessment	Problem
Pulse	Arrhythmias
Blood pressure	Postural hypotension
Orthostatic blood pressure	
Mental status/LOC/oxygen saturation	Changes in cognition, LOC, hypoxia
Vision screening	Deficits in acuity, depth perception, accommodation, peripheral vision
PERRLA	
Muscle strength	Weakness in one or both sides
ROM in neck, spine, and extremities	Pain, limitation in range of motion
Gait and balance	Deficits in postural control, balance coordination, station, and gait
Gait and movements, Romberg test	

Figure 12-2 Home safety checklist.

All Living Spaces

_____ Remove throw rugs.
_____ Secure carpet edges.
_____ Remove low furniture and objects on the floor.
_____ Reduce clutter.
_____ Remove cords and wires on the floor.
_____ Check lighting for adequate illumination at night (especially in the pathway to the bathroom).
_____ Secure carpet or treads on stairs.
_____ Install handrails on staircases.
_____ Eliminate chairs that are too low to sit in and get out of easily.
_____ Avoid floor wax (or use nonskid wax).
_____ Ensure that the telephone can be reached from the floor.

Bathrooms

_____ Install grab bars in the bathtub or shower and by the toilet.
_____ Use rubber mats in the bathtub or shower.
_____ Take up floor mats when the bathtub or shower is not in use.
_____ Install a raised toilet seat.

Outdoors

_____ Repair cracked sidewalks.
_____ Install handrails on stairs and steps.
_____ Trim shrubbery along the pathway to the home.
_____ Install adequate lighting by doorways and along walkways leading to doors.

Source: Ambulatory geriatric care. Rubenstein, L. Z. Falls. In: Yoshikawa, T. T., Cobbs, E. L., & Brummel-Smith, K., eds. 296–304, (1993) with permission from Elsevier.

a raised toilet; marking stairs and thresholds with fluorescent tape; encouraging the use of eyeglasses and hearing aids; and maintaining adequate lighting throughout the house. Adequate lighting includes installing night-lights throughout the house, using 100-watt nonglare lightbulbs (ceiling lights are best), placing a light switch at the entrance to prevent the elder from entering a dark house or rooms, and ensuring that all stairwells and hallway are well lit to avoid shadows.

Evaluate Gait and Balance

Assess muscle strength and ability frequently and institute appropriate measures for safe mobility and transfer techniques. The Tinetti

Assessment Tool (Ledford, 1997) provides an objective measure to evaluate gait and balance. Educate patients with gait and balance deficiencies on safety measures such as calling for assistance when getting out of bed. Do not leave patients with gait and balance deficiencies in situations where they can attempt to get up and move without support and assistance; for example, avoid leaving a patient in the bathroom alone.

In the community setting, encourage a regular exercise program to improve balance and coordination, such as tai chi or yoga, based on the individual's abilities. Involve older patients in an exercise program to increase muscle strength, such as low-intensity leg strengthening and weight-bearing exercises. It is important to educate clients on what to do if they fall. Useful techniques include turning from the supine position to the prone position, getting on all fours, crawling to a strong support surface, and pulling up. Having frequent contact with family or friends, a phone that can be reached from the floor, or a remote alarm system can decrease the likelihood of lying on the floor for a long time after a fall (Beers & Berkow, 2005).

If the older person uses an assistive device such as a walker, teach and monitor the proper use of these devices. For example, a rolling walker may be safer than a regular walker if the older person is unable to lift the standard walker or attempts to carry the walker. Check the tip end of walkers and canes to be sure they have sufficient smooth tread and replace when necessary. Also make sure all moving parts are clean and any rough edges are smoothed or covered to prevent damage to the skin. Providing hip protectors for patients in institutions with a high incidence of hip fractures appears to reduce the incidence of such fractures (Gillespie, Gillespie, Cummings, Lamb, & Rowe, 2000). However, because they are heavy, are made of polypropylene, and must be worn 24 hours a day, compliance in their use is only between 30% and 50%.

Review Medications

During an inpatient admission is a good time to thoroughly review all the medications the patient is on for desired effect, adverse effect, interactions, and the older person's knowledge base of the medications they are taking. This would include identifying the patient's knowledge of the drug, dosage, administration, and adverse effects, as well as compliance. It is also essential to ask about over-the-counter medications he or she is also taking. Patients on four or more medications are at a higher risk for falls (Capezuti, 1996). Special attention should be given to drugs that affect mobility such as sedatives, hypnotics, psychotropics, and antihypertensives. Patients should be taught about interventions to prevent postural hypotension such as changing positions slowly to prevent syncope. When beginning a new medication, elders should be monitored closely, especially if the medication has the potential to effect mobility, balance, and/or cognition. Additional strategies for helping older persons to manage their medications are discussed in the "Polypharmacy" section earlier in the chapter.

Develop a Fall Prevention Plan

Tinniti et al. (1988) found that risk of falling increased with the number of disabilities, but that modifying just a few factors may reduce the risk. Vassallo et al. (2004) describe a multidisciplinary, proactive approach to fall prevention in a rehabilitation hospital that led to a 15.3% reduction in the number of falls and a 51.1% reduction in patients sustaining an

Table 12-4 Performance-Oriented Assessment of Gait

	Observation		
Components	**Normal = 0**	**Abnormal = 1**	**Number**
Initiation of gait (patient asked to begin walking down hallway)	Begins walking immediately without observable hesitation; initiation of gait is single, smooth motion	Hesitates; multiple attempts; initiation of gait not a smooth motion	
Step height (begin observing after first few steps: observe one foot, then the other, observe from side)	Swings foot, completely clears floor but by no more than 1–2 inches	Swings foot, not completely raised off floor (may hear scraping) or is raised too high (> 1–2 inches)	
Step length (observe distance between toe stance, foot, and heel of swing foot; observe from side; do not judge first few or last few steps; observe one side at a time)	At least the length of individual's foot between the stance toe and swing heel (step length usually longer but foot length provides basis for observation)	Step length less than described under normal conditions	
Step symmetry (observe the middle part of the patch, not the first or last steps; observe from side; observe distance between heel of each swing foot and toe of each stance foot)	Step length same or nearly same on both sides for most step cycles	Step length varies between sides or patient advances with same foot with every step	
Step continuity	Begins raising heel of one foot (toes off) as heel of other foot touches the floor (heel strike); no breaks or stops in stride; step lengths equal over most cycles	Places entire foot (heel and toe) on floor before beginning to raise other foot; or stops completely between steps or step length varies over cycles	

(continues)

Table 12-4 PERFORMANCE-ORIENTED ASSESSMENT OF GAIT (CONTINUED)

	Observation		
Components	**Normal = 0**	**Abnormal = 1**	**Number**
Path deviation, observe from behind; observe one foot over several strides; observe in relation to line on floor (e.g., tiles) if possible (difficult to assess if patient uses a walker)	Foot follows close to straight line as patient advances	Foot deviates from side to side or toward one direction	
Trunk stability (observe from behind; side to side motion of trunk may be a normal gait pattern; need to differentiate this from instability)	Trunk does not sway; knees or back are not flexed; arms are not abducted in effort to maintain stability	Any of preceding features present	
Walk stance (observe from behind)	Feet should almost touch as one passes other	Feet apart with stepping	
Turning while walking	No staggering; turning is continuous with walking, and steps are continuous while turning	Staggers; stops before initiating turn; or steps are discontinuous	
	Add up numbers in ***Number*** *column to get* **TOTAL SCORE**: **A higher score reflects greater risk for falls.**		

Source: University of Iowa EBP on fall prevention.

injury. A fall-risk assessment was conducted by the health care team on admission and repeated weekly. At-risk patients were identified with a red armband. Other essential components of a fall prevention program include close routine monitoring, anticipation of needs, offering frequent toileting, bedside commodes, call lights, bed alarms, transfer techniques, hip protectors, a regular exercise program, and patient and family education. Reduction of fractures and less serious injuries from falls resulted from treatment of osteoporosis with calcium and vitamin D (Gallager, 1994; Gillespie et al., 2004).

Restraint Use

Agitation or confusion caused by delirium is a particularly significant risk for falls (Hayes, 2004; Holmes & House, 2000). Harrison, Booth, and Algase (2001) reported that patients who experience multiple falls typically have lower cognitive scores. Restrictive procedures were designed to reduce or eliminate maladaptive or unsafe behaviors (e.g., falls, the removal of medical devices, wandering away). However, Tinetti et al. (1988) found that the use of physical restraints failed to prevent falls and was associated with continued fall-related accidents as well as an increase in serious injuries from a fall. Restrictive procedures involve the use of **physical restraints** and **chemical restraints**. A physical restraint is any physical or mechanical device (e.g., waist restraint, wrist restraint, geriatric chair) that involuntarily restrains a patient as a means of controlling physical activity. A chemical restraint refers to the use of a psychopharmacological drug for the purpose of discipline or convenience, and not to treat medical symptoms (Ledford & Mentes, 1997). The deconditioning effect of immobility resulting from the use of a restraint compounded by impaired judgment secondary to dementia were implicated as underlying factors in these findings (Tinetti et al., 1988). Ledford & Mentes (1997) reported 13%–47% of older patients who fall are physically restrained.

There are six common myths associated with the use of restraints in the elderly (Evans & Strumph, 1990):

Myth: Elderly clients should be restrained to protect them from falls.

Fact: The risk of falls and injury increases when restraints are used.

Myth: It is a moral duty to protect the elderly from harm by use of restraints.

Fact: Restraints put the elderly at higher risk for problems associated with im-mobility such as pressure ulcers, contractures, and confusion.

Myth: Failure to restrain puts individuals at risk for legal liability.

Fact: U.S. courts are reluctant to hold that there exists a duty to restrain, stating that restraint use is undesirable and decreases the patient's quality of life.

Myth: It doesn't bother the elderly to be restrained.

Fact: Many elderly experience feelings of anger, fear, humiliation, discomfort, demoralization, and punishment when they are restrained (Strumph & Evans, 1988).

Myth: We have to restrain because of inadequate staffing.

Fact: In facilities where restraint-free policies exist, alternatives to restraints appear to consume less staff time than that required by using restraints.

Myth: Alternatives to physical restraints are unavailable.

Box 12-6 Types of Physical Restraints

Wrist and leg restraints
Wheelchair safety bars
Vest restraints
Mitts
Chairs with lapboards
Beds with siderails
Bedsheets

Fact: Many alternatives exist including companionship or supervision, changing or eliminating bothersome treatment, environmental manipulations, reality orientation, psychosocial interventions, and diversionary and physical activities.

Despite standards aimed at minimal or no restraint use, approximately 15% of nursing home residents spend a portion of the day in restraints or confined inappropriately by siderails. In acute care, 18%–25% of those aged 65 years or older, and up to 22% of those aged 75 years or older, are restrained (Hartford Institute for Geriatric Nursing). Instead of preventing harm, the use of physical and/or chemical restraints can have an adverse impact on functioning. The use of physical restraints increases the risk for falls, confusion, death by strangulation, and complications of immobility (e.g., contractures, pressure ulcers, pneumonia, UI, and learned helplessness) (Ledford & Mentes, 1997). Falls, hypotension, sedation, tardive dyskinesia, and extrapyramidal and anticholinergic side effects are associated with the use of chemical restraints (Ledford & Mentes, 1997).

A restraint-free environment is the ideal. Nursing care should focus on reducing, and hopefully eliminating, the need for restraints. A variety of interventions have been identified as alternatives to restraints. Providing companionship and supervision from staff, family, friends, or volunteers prevents the patient from being alone. This is most important during the night when patients often become disoriented and wander. Bothersome treatments such as IVs, NG tubes, catheters, and drains need to be assessed for the possibility of being changed or removed. Environments should be designed to decrease confusion, overstimulation, and safety concerns. Examples of this would be lighting that eliminates shadows, low noise levels, beds in low positions with siderails down, accessible call lights, and a quick response to the call light. The use of reality orientation, therapeutic touch, reality links such as radios and televisions, and active listening are all appropriate interventions to reduce and/or prevent anxiety and confusion. Diversional and physical activities are also helpful in preventing the use of restraints. Other successful interventions include the use of music therapy, pressure-sensitive bed alarms, toileting regimes per the patient's own schedule, placing a sponge ball in the hand to prevent pulling on tubes, giving the patient a picture of a family member to hold, or giving them a small pillow or stuffed animal to hug.

Falls present a serious health problem for millions of elders, often resulting in injury, loss of independence, and a reduction in quality of life. Although all falls are not preventable, identifying an individual's risk factors for falls and implementing appropriate interventions in response to the identified risks can play a vital role in preventing falls and minimizing injuries from a fall. The negative outcomes of physically and/or chemically restraining an elder to prevent injuries are well documented. The ability to minimize injuries and avoid restraints is dependent on the creativity and vigilance of the nursing staff and administrative support. Nurses must strive for a restraint-free environment to prevent physical and psychological harm in the older patient.

Anxiety

Prevalence

The U.S. Surgeon General reported that 11.4% of adults over the age of 55 met criteria for anx-

iety disorders, with phobic anxiety disorders being the most prevalent in older adults. Nonspecific anxiety rates are reported to be up to 17% in older men and 21% in older women (U.S. Public Health Service, 2000).

Implications/Relevance of Anxiety

Anxiety is a normal adaptive reaction to new situations or perceived threats and can manifest as tachycardia and palpitations, gastrointestinal disorders, insomnia, and tachypnea. A student may experience this during a class final examination or while performing a skill on a patient for the first time. This physiologic reaction, during which the sympathetic nervous system is dominant, serves to motivate and energize. However, recurring and chronic anxiety can complicate many illnesses, including hypertension, heart disease, chronic obstructive pulmonary disease, and diabetes, and can interfere with activities of daily living. Anxiety in patients with chronic medical conditions significantly increases their duration of disability. The presence of anxiety in the older adult correlates with and predicts cognitive decline and impairment (Sinoff & Werner, 2003). Feeney (2004) measured the relationship between anxiety and pain perception in a population over the age of 65 and found that anxiety significantly elevated acute pain perception. During the relaxation response, the parasympathetic nervous system is dominant.

Warning Signs/Risk Factors for Anxiety

Anxiety disorders include **generalized anxiety disorder** and **panic disorder**. Generalized anxiety disorder (GAD) is characterized by persistent, excessive worry with fluctuating severity of symptoms that include restlessness, irritability, sleep disturbance, fatigue, and impaired concentration. This disorder typically manifests early in life, but is a chronic condition that continues into the later adult years. Many individuals with GAD also have significant depression.

Panic attacks are characterized by an autonomic arousal that includes tachycardia, difficulty breathing, diaphoresis, light-headedness, trembling, and severe weakness. Between attacks, the individual spends a great deal of time and energy worrying about the next exacerbation. Genetics appear to play a significant role, with a 20% risk among relatives of individuals with panic disorder. The older adult may experience a decreased autonomic response to emotional states and symptoms may be masked (Mohlman et al., 2004); therefore, cues to anxiety problems may be subtle and easily overlooked. Nonspecific complaints such as weakness, feeling lightheaded, or a slight increase in heart and respiratory rate may signal anxiety.

Older adults with chronic medical conditions are at a much higher risk for the development of anxiety disorders when compared to those without chronic illnesses (Beekman et al., 1998; Mehta et al., 2003). Psychosocial stressors and negative life events, such as the death of a

Box 12-7 Medical Conditions That Cause or Exacerbate Anxiety

Cardiac arrhythmias	Hypoglycemia
Hyperthyroidism	Pheochromocytoma
Chronic obstructive pulmonary disease	Hypertension

spouse, significantly increase the incidence of anxiety in older adults. Catastrophic events in early life, poor subjective health, lack of an adequate support network, loneliness, and perceived vulnerability all contribute to the risk of developing anxiety disorders in later life (Beekman et al.).

Assessment

Instruments available to assess anxiety include the State-Trait Anxiety Inventory (STAI) and the Hospital-Anxiety Inventory. An important concept in using assessment instruments is to determine each one's appropriateness in the specific population. An instrument that has been researched only in the critical care setting may not prove as useful in the community-dwelling population. Nursing assessment should include risk identification, medical evaluation, and careful attention to the client's verbalization of thoughts and feelings. Anxiety and depression are often undetected in the older population, and nurses are in key positions to identify both risks and symptoms of these problems. Successful treatment increases the quality of life in the older adult; a goal of care should be early identification and intervention.

Interventions/Strategies for Care

Nursing interventions in the acute care setting include instructions prior to painful procedures and in self-management of pain. Many interventions for pain, such as relaxation, breathing techniques, distraction, and cognitive restructuring, can simultaneously decrease anxiety (Feeney, 2004). If patients perceive higher levels of control in any situation, anxiety is reduced. Com-

Box 12-8 Drugs That Can Cause or Worsen Anxiety

Baclofen	Caffeine
Pseudoephedrine	Theophylline

Box 12-9 Nursing Care for the Patient Experiencing Acute Anxiety

Decrease environmental stimuli.
Stay with the patient.
Make no demands and do not ask the patient to make decisions.
Support current coping mechanisms (crying, talking, etc.).
Don't confront or argue with the patient.
Speak slowly in a soft, calm voice.
Avoid reciprocal anxiety. (Emotions can be contagious, and sensing anxiety in the nurse can worsen the patient's anxiety.)
Reassure the patient that the problem can be solved.
Reorient the patient to reality.
Respect the patient's personal space.

Box 12-10 Deep Breathing Exercises

Have the patient sit in a comfortable chair, with hands on the abdomen. Ask the patient to inhale slowly and deeply, feeling the abdomen rise. Hold the breath for a few seconds. Ask the patient to exhale slowly, allowing the abdomen to deflate. Repeat several times, always speaking in a soft, calm manner.

Box 12-11 Progressive Muscle Relaxation

The patient should lie down in a comfortable position. Ask the patient to tighten the muscles in his or her hand for a few seconds, and then completely release the tension to relax the muscle. Focusing on a specific muscle by tightening and releasing tension provides a greater relaxation response to the area. Progressively concentrate on the muscles of the arms, shoulders, face, chest, back, abdomen, legs, and feet. Again, use a soft, calm voice to assist the patient through the process.

munity and social resources should be identified and made available to those with chronic anxiety disorders. It does not benefit a patient to have a health care practitioner referral if they are unable to arrange transportation or financial support to initiate or continue their care.

Box 12-12 Cognitive-Behavioral Therapy

Cognitive-behavioral therapy assists the patient with recognizing cues to anxiety. Once they have identified factors that cause their anxiety, they are able to cognitively "practice" experiencing those situations. Effective coping mechanisms are identified and used during the therapy. When the patient encounters the situation in real life, he or she is able to cope because they have had the opportunity to cognitively review their reactions.

Medications to treat anxiety include benzodiazepines, selective serotonin reuptake inhibitors (SSRIs), and serotonin-norepinephrine reuptake inhibitors (SNRIs). Adverse reactions with benzodiazepines include drowsiness, fatigue, cognitive and psychomotor problems, confusion, and depression. SSRIs may result in side effects of headache, nausea, sedation, and insomnia.

Individuals of any age often experience anxiety and depression simultaneously. Rates of anxiety in older adults with depression have been reported as high as 47% (Mehta et al., 2003).

Depression

Prevalence

Although **depression** is the most common mental health disorder in older adults, it is not a normal consequence of aging. Role changes, major life events, and comorbid illnesses all contribute to an increased rate of depression in the geriatric population. According to the U.S. Surgeon General, 19.8% of American adults over the age of 55 experience mental disorders, with depression and anxiety occurring most frequently. In older adults with comorbid illnesses, the rate of depression is as high as 37% (U.S. Public Health Service, 2000).

Implications/Relevance of Depression

Depression is a significant risk for suicide, and older adults have the highest rates of suicide in the United States. Many geriatric individuals who commit suicide have primary care visits within one month of the suicide, yet symptoms of depression are often undetected or inadequately treated by the medical practitioner.

Box 12-13 Medical Conditions that Increase Risk of Depression

Hypothyroidism	Arthritis	Hypertension	Stroke/brain attack
Heart disease	Diabetes	Arthritis	Parkinson's Disease
Multiple sclerosis	Cancer	Huntington's disease	

Depression is linked to a decreased quality of life in the older adult, through loss of interest, motivation, creativity, and ability to plan (Fassino et al., 2002). Depressed individuals perceive medical illnesses as having a greater impact on everyday life and have twice the health care costs of nondepressed adults with similar illnesses (Badger & Collins-Joyce, 2000). Older adults with depression have higher mortality rates from coexisting conditions, such as cardiovascular disease and cancer. In an epidemiological study, depression of more than 4 years raised the risk of cancer in older adults by 88% (Pennix et al., 1998). Surgical patients who are depressed have poorer outcomes and lengthier recoveries (Alexopoulous et al., 2002). Therefore, early identification and treatment of depression are of key importance in improving the quality and, possibly, the quantity of life for older adults.

Depression, Dementia, and Delirium

Depression in the older adult can often be difficult to recognize. **Dementia**, **delirium**, medication side effects, and situational grief response can complicate the diagnosis of depression. The American Psychiatric Association (2000) has standard diagnostic criteria for delirium, depression, and dementia. Delirium manifests as a disturbance in consciousness or cognitive or perceptual change that develops over a period of time, fluctuates during the course of the day, and is a physiological consequence of a medical condition or medication. Delirium can often be resolved by altering external or internal factors. Sleep pattern disturbances can be the etiology for delirium, and close attention should be given to the client's sleep-wake cycle and sleep patterns. Forty-five to fifty-nine percent of hospitalized older adults experience delirium, and in 25% of those cases, irreversible neurological damage or death occurs (Martin & Haynes, 2000).

Dementia, a group of symptoms accompanying disease, manifests as memory loss; disorientation; changes in mood or personality; and difficulties in abstract thinking, task performance, and language use. Dementia is a gradual, but continuous, cognitive decline. The most common form of dementia is Alzheimer's disease. Other disorders associated with the development of dementia include brain attacks, Huntington's disease, AIDS, and Parkinson's disease (Martin & Haynes, 2000). Antidepressant medications do not improve symptoms of dementia in patients with primary dementia disorders (Raj, 2004).

The American Psychiatric Association (2000) defines depression as a disorder that includes changes in feelings or mood, described as feeling sad, hopeless, pessimistic, or "blue" lasting most of the day, with loss of interest in pleasurable activities. These symptoms represent a change from the person's previous level of func-

tioning. Depression manifests as a loss of interest in life and usual activities, fatigue, decreased concentration and short-term memory, changes in appetite, fluctuations in weight and sleep habits, and irritability and anxiety. Depression, dementia, and delirium can also occur simultaneously, further complicating diagnosis and treatment (Martin & Haynes, 2000).

Assessment

Screening instruments for depression in the geriatric primary care population include the Geriatric Depression Scale (GDS), the Center for Epidemiologic Studies Depression Scale (CES-D), and SelfCARE(D). The Cornell Scale for Depression in Dementia (CSDD) is a reliable and valid instrument for assessing depression in older adults who also have dementia (Watson & Pignon, 2003). Proper diagnosis and treatment of depression relies on the practitioner's ability to determine underlying medical conditions or medication side effects contributing to or causing the depression. Nursing observations and communication with clients, families, and caregivers are important in identifying older adults with depression and those at risk of developing depression. Many older adults may avoid complaining of sadness or depression. This, along with societal expectations that older adults are more fatigued and less interested in activities, can disguise symptoms of depression and deprive patients of treatment (Amella, 2004).

Box 12-14 Drugs That Can Precipitate Depression

Indomethacin	Digitalis
Diuretics	Cimetidine
Hydralazine	Procainamide
Propanolol	Corticosteroids
Reserpine	Amantadine
Levodopa	Estrogen
Melatonin	

Interventions/Strategies for Care

Treatment of depression in the older adult is aimed toward remission and prevention of recurrence. Early recognition of risk and appropriate therapy can increase both the quality and quantity of life in the depressed older client. Pharmacological therapy, including tricyclic antidepressants (TCAs) and SSRIs, require close monitoring because of the increased risk of adverse effects in the older individual. SSRIs are the first choice for treatment of depression in the elderly because they are much safer in overdose and side effects are better tolerated than those of TCAs (Raj, 2004). Care must be taken to avoid drug–drug interactions while considering the older adult's physiological changes in absorption, metabolism, distribution, and excretion of drugs. This is further discussed in Chapter 8. Although older adults respond to antidepressants, their response takes longer than younger adults and they have a higher risk of recurrence.

Venlafaxine, which has a high rate of remission, can cause hypertension, headache, sexual dysfunction, and anxiety. SSRIs can cause sexual dysfunction, nausea, diarrhea, headache, anxiety, and tremor. TCAs have anticholinergic effects, including dry mouth, that can result in an inadequate intake of nutrition, arrhythmias that may be exacerbated in coexisting heart disease, and falls related to orthostastic hypotension.

Serotonin syndrome is a potentially life-threatening condition of elevated serotonin levels. SSRIs, TCAs, and serotonin receptor agonists all increase serotonin and the risk of

the syndrome. Symptoms include disorientation, irritability, agitation, anxiety, myoclonus, muscle rigidity, hyperreflexia, tremor, ataxia, hyperthermia, diaphoresis, tachycardia, hypertension, and tachypnea. Treatment consists of withdrawing the medication and managing symptoms.

Nursing interventions that can improve depression include exercise, light therapy, alternative medicine, and counseling (Lam & Kennedy, 2004). Life review therapy, a form of reminiscence, significantly decreases minor depression in nursing home residents, who have much higher rates of depression than their community-dwelling cohorts. Depressed individuals reminisce about their life and reframe decisions and choices made throughout their life (Haight & Michel, 1998). Events or decisions that make the individual unhappy are reintegrated in a more acceptable manner. Mild to moderate exercise releases tension and increases the body's production of endorphins, which can be natural mood elevators. Exercises can be as light as stretching maneuvers such as yoga or tai chi or as strenuous as running, aerobics, or swimming.

Urinary Incontinence

In recent years, the notion of **urinary incontinence (UI)** being an inevitable consequence of aging, of being a woman, or of bearing children has been challenged by research demonstrating effective treatment for this common problem. Urinary incontinence, defined as the involuntary leakage of urine, is a common health problem that affects more than 16 million Americans. However, it has been estimated that about 80% of adults with UI can experience significant improvement or resolution of their symptoms with evaluation and treatment (Urinary Continence Guideline Panel, 1992). The barrier to realization of this improvement is often a failure in health care to identify those with continence problems, to conduct a comprehensive assessment, and to initiate targeted interventions to address causes and contributing factors. Professional nursing has the knowledge, skills, opportunity, and responsibility to provide beginning continence care: screening patients, performing a basic evaluation, and initiating treatment or refering patients to a specialist if specialized care is indicated (Jirovec, Wyman, & Wells, 1998).

Prevalence

UI affects men and women of all ages, at all levels of health, in all settings. Prevalence estimates vary widely, primarily due to differences in the definition of incontinence and the population studied. A review of the literature indicates a median range between 30% and 40% among middle-aged women that increases to 30%–50% in older women living in the community (Hunskaar et al., 2002). Prevalence rates in men have a similar pattern, although the rates are lower. Prevalence rates range from 1%–5% in middle-aged men, with rates increasing to 9%–28% in older men living in the community (Hunskaar et al.). Incontinence may affect up to 43% of acute care patients (Lincoln & Roberts, 1989); prevalence rates in institutions rise to 50% or higher (Hunskaar et al.). Although UI is not a normal consequence of aging, certain physiological changes that accompany aging increase the risk for development of voiding problems, and certain conditions that predispose to continence problems are more likely to occur in older persons. Normal aging changes in the urinary system and their

significance in the older adult were discussed in Chapter 6.

Implications of UI

The adverse impact of UI on physical and psychosocial functioning has been frequently discussed in lay and professional literature. Depression and anxiety have long been recognized as potential causes and consequences of incontinence (Dugan et al., 2000; Wells, 1984). Uninhibited bladder activity, especially in older people, is believed to be susceptible to influences of psychological factors such as regression, rebellion, sensory deprivation, and the loss of conditioned reflexes (Ory, Wyman, & Yu, 1986). Relationships, activities of daily living, and self-concept are frequent victims of urinary incontinence (Largo-Jannsen, Smits, & Van-Well, 1992; Macauly, Stern, Holmes, & Stanton, 1987; Wyman, Harkins, Choi, Taylor, & Fantl, 1987). UI increases the risk of hospitalization and substantially increases the risk of admission to nursing homes in persons over 65 years of age (Thom, Haan, & Van Den Eeden, 1997). Urge incontinence occurring weekly or more frequently is associated with an increased risk of falls and nonspine, nontraumatic fractures in community-dwelling women aged 65 years and older (Brown et al., 2000). Incontinence is one of the major risk factors for the development of skin breakdown (U.S. Department of Health and Human Services, 1994). The economic impact of UI also is substantial, with costs estimated to be $16.3 billion per year in 1995 dollars (Wilson et al., 2001). The cost for management is often an out-of-pocket expense (not covered by insurance) and may interfere with the ability of a person on a fixed income to purchase medications or supplies to manage other health problems.

The nature and degree to which negative consequences result from incontinence is somewhat controversial (Thomas & Morse, 1991). The vast majority of incontinent persons in the community do not seek help for their incontinence because they consider it a normal part of aging (Urinary Continence Guideline Panel, 1992). This raises questions about how people with this problem perceive UI and what determines the significance attributed to the problem. Many noninstitutionalized individuals do not consider incontinence a major problem (Goldstein, Hawthorne, Engeberg, McDowell, & Burgio, 1992; Jeter & Wagner, 1990).

Relatively little is known about factors that influence one's perception of incontinence. Women with urge incontinence and mixed incontinence reported more emotional disturbance than an age-matched control group without incontinence, and women with all types of incontinence were more socially isolated than the control group (Grimby, Milson, Molander, Wiklund, & Ekelund, 1993). Other studies support that sensory or irritative symptoms are the most problematic (Wyman, 1994b). The influence of the severity of incontinence on the effects attributed to incontinence is not clear. Interviews with women 31–50 years old suggest the length of time a person has been incontinent influences the impact of the incontinence (Skoner, 1994). Women who had been inconti-

Box 12-15

The majority of people with urinary incontinence have not sought help. Health care providers must take the initiative and screen persons at risk.

nent longer were more relaxed and spoke more objectively about their incontinence in comparison to those with recent onset of incontinence (Skoner, 1994).

Assessment

An understanding of the types of incontinence and the factors associated with incontinence is necessary to guide evaluation and the development of appropriate targeted interventions. Urinary incontinence is categorized as **transient** (acute) or **established** (chronic) based on onset and etiology. Transient incontinence is caused by the onset of an acute problem that once successfully treated will result in the resolution of incontinence. Multiple causative and contributory factors have been associated with the development or exacerbation of voiding problems, in particular UI. **Table 12-5** lists common transient causes and potentially reversible factors; a brief explanation of the basis for their impact on continence is provided. If transient causes are ruled out or treated and incontinence continues, the problem is considered established.

Chronic incontinence encompasses four basic disorders: stress, urge, overflow, and functional incontinence. **Stress incontinence** refers to the involuntary loss of urine during activities that increase intra-abdominal pressure (e.g., lifting, coughing, sneezing, and laughing). Stress incontinence is distinguished from urge leakage or overflow incontinence by the absence of bladder contraction or overdistention, respectively. The most common causes of stress incontinence are hypermobility of the bladder neck and urethral sphincter defects. Weakness of the pelvic floor muscles leads to loss of support for the bladder neck and disrupts the normal pressure gradient between the bladder and urethra, resulting in leakage of urine (Urinary Continence Guideline Panel, 1992). **Urge incontinence** is associated with a strong, abrupt desire to void, and the inability to inhibit leakage in time to reach a toilet. Uninhibited bladder contractions usually, but not always, are a precipitating factor. Central nervous system disorders, such as stroke or multiple sclerosis, and local irritations such as infection or ingestion of bladder irritants (e.g., caffeine) are potential causes. **Reflex incontinence,** a variation of urge incontinence, results from uninhibited bladder contractions with no sensation of needing to void or urgency (Consensus Conference, 1989). This condition is seen most often in spinal lesions transecting the cord above T10-11. **Overflow incontinence** refers to overdistention of the bladder due to abnormal emptying. The leakage may be continual or resemble the symptoms of stress or urge incontinence. Overflow incontinence results from a weak or areflexic bladder, neurologic conditions such as diabetes, spinal cord injury below T10-11, or obstruction of the bladder outlet or urethra (Urinary Continence Guideline Panel, 1992). **Functional incontinence** refers to problems from factors external to the lower urinary tract such as cognitive impairments, physical disabilities, and environmental barriers (Urinary Continence Guideline Panel, 1992). Although separate disorders, clinically, patients may exhibit symptoms of more than one type of incontinence. Pure stress and pure urge incontinence were uncommon in a urodynamic evaluation of 263 women and men aged 65 years and older (Ouslander, Hepps, Raz, & Su, 1986). The term **mixed incontinence** refers to the existence of the symptoms of urge and stress incontinence at the same time. Diagnosis of the type(s) of UI experienced is essential to the development of interventions that must be designed according to or modified to address varying levels of cognitive and physical functioning.

Table 12-5 Transient Causes of Urinary Incontinence

The mnemonic DIAPPERS has been established to list common causes of transient incontinence.

Common Causes	Rationale
Delerium/dementia	Altered cognitive functioning interferes with the ability to recognize the need for toileting or respond in a timely manner.
Infection	The urinary frequency and urgency associated with symptomatic UTI may lead to urinary incontinence.
Atrophic vaginitis/urethritis	Decreased estrogen in women results in thin, dry, friable vaginal and urethra mucosa.
Psychological	Depression may interfere with an individual's motivation and desire to perform activities of daily living or attend to continence. Anxiety or fear that leakage will occur may contribute to frequency and difficulties controlling urge.
Pharmacological agents	Inadequate management of acute or chronic pain can interfere with the ability to attend to toileting needs. Narcotics, a component of many pain management regimens, can lead to constipation and fecal impaction that obstructs the bladder neck, leading to urine retention, overflow incontinence, and urgency. Narcotics can also decrease bladder muscle contraction resulting in urine retention, incomplete bladder emptying, increased risk for UTI, and overflow incontinence. Many medications have adverse or unintended side effects that may directly impact bladder function, bladder relaxation, urinary sphincter relaxation or obstruction, cognitive status (awareness of an effective response to need to void), or urine production. Polypharmacy increases the risk for adverse drug effects and drug interactions.
Endocrine disease	Metabolic conditions (hyperglycemia, hypercalcemia, low albumin states, diabetes, insipidus) associated with polyuria increase fluid load on the bladder and increase the risk for urge and stress incontinence.
Restricted mobility	Limited ability to move about interferes with the ability to reach a toilet in time to prevent leakage.
Stool impaction	Overdistention of the rectum or anal canal can obstruct the bladder neck, leading to urine retention, overflow incontinence, and urgency.

Variability in the types of voiding problems that may be experienced and the diverse nature of causative and contributing factors necessitate a comprehensive evaluation of urologic functioning. The evaluation recommended by the Clinical Practice Guidelines on Urinary Incontinence for Adults outlines the components that should be included in an initial evaluation (Urinary Incontinence Guideline Panel, 1992). The elements of a basic evaluation are outlined in **Table 12-6** and discussed in greater detail in the following text with respect to the older patient.

HISTORY

The first step in the evaluation is a discussion of voiding patterns and problems. Initiating this line of questioning by focusing on usual number of voids during the day and through the night, and the presence of other symptoms of voiding problems such as burning, hesitancy, pain, or low pelvic pressure, provides a less threatening opening to this topic while securing useful information. It may be necessary to reword questions about the presence of incontinence to determine the occurrence of wetting accidents, their frequency, and volume of urine lost. Asking about the use of padding or protective garments may also provide important clues to the presence of incontinence or the fear of an accident. The onset and duration of voiding problems and activities that precipitate or are associated with their occurrence should be ascertained as well. Of particular relevance is determining the status of bowel functioning and usual bowel habits. A recall of daily food and fluid intake also provides important information in the evaluation of urological functioning and development of a treatment plan. It is not uncommon for patients with urgency and urge incontinence to report a fluid intake that consists primarily of bladder irritants (e.g., diet drinks, carbonated caffeinated beverages), and minimal to no water. Dietary modifications alone have often significantly reduced urgency and problems precipitated by urge. The initial interview should help identify potentially reversible causative factors and contributing risk factors for UI. The history should provide clues to type(s) of incontinence involved. **Table 12-7** lists common reversible factors in UI.

An awareness of the specific symptoms experienced and the degree of discomfort associated with each can be useful in determining the priority for intervening. Individual responses to incontinence vary greatly (Wyman, 1994b). Identifying those aspects of daily life that incontinence or the fear of incontinence disrupt will help specify outcomes to evaluate the success of treatment. For example, if UI interferes with exercise, then participation in a exercise regimen three times a week might be the goal set with the patient that is evidence of an effective plan of care.

Interviews and conversations with persons experiencing incontinence have revealed the difficulty many experience thinking about and discussing this very personal and usually private matter. The use of a tool that provides words and choices for responses frequently facilitates the exchange of information. Short form versions of

Table 12-6 COMPONENTS OF A BASIC EVALUATION FOR URINARY INCONTINENCE

- **History**
  - Focused medical, neurologic, and genitourinary history
  - Assessment of risk factors
  - Review of medications
  - Detailed exploration of the symptoms of incontinence
- **Physical examination**
  - General examination
  - Abdominal examination
  - Rectal examination
  - Pelvic examination in women
  - Genital examination in men
- **Postvoided residual volume**
- **Urinalysis**

Source: Fantl, J. A., Newman, D. K., Colling J., et al. Managing Acute and Chronic Incontinence in Adults. Clinical Practice Guideline, No. 2, 1996 Update. Rockville, MD: U.S. Department of Health and Human Services, Public Health Service, Agency of Health Care Policy and Research. AHCPR Pub-No. 96-0686. March 1996.

the Urogenital Distress Inventory/Incontinence Impact Questionnaire (UDI/IIQ) provide objective measurement of the life impact and symptom distress, respectively, of urinary incontinence and related conditions for women. With minor modifications in the wording of some items, the tool can be used with men and can be used from hospitalization through reintegration into the community. A copy of this tool and modifications used with men and hospitalized patients can be found in Table 12-7. If the patient has communication or cognitive deficits, information may have to be obtained or corroborated by family when possible. Previous medical records or observation of current behaviors may be the only source of data available.

Bladder Diary

The **bladder diary** or bladder record is a critical component of a basic evaluation, regardless

Table 12-7 Urogenital Distress Inventory Short Form (IIQ-6) and Incontinence Impact Questionnaire Short Form (UDI-6)

Do you experience and, if so, how much are you bothered by:

1. Frequent urination
2. Urine leakage related to feeling of urgency
3. Urine leakage related to activity, coughing, or sneezing
4. Small amounts of urine leakage (drops)
5. Difficulty emptying your bladder
6. Pain or discomfort in lower abdominal or genital area

Has urine leakage affected your:

1. Ability to do household chores (cooking, housekeeping, laundry) *(daily activities)*
2. Physical recreation such as walking, swimming, or other exercise *(therapy sessions)*
3. Entertainment activities (movies, concerts, etc.)
4. Ability to travel by car or bus more than 30 minutes from home *(delete by car or bus; travel from your room or unit)*
5. Participating in social activities outside your home
6. Emotional health (nervousness, depression, anger)
7. Feeling frustrated

Key to scoring

0 = Not at all
1 = Slightly
2 = Moderately
3 = Greatly

(Information in parentheses are modifications to reflect inpatient activities.)

Source: Uebersax, J. S., Wyaman, J. F., Schumaker, S. A., Fantl, J. A. Continence Program for Woman Research Group (1995). Short forms to assess life quality and symptom distress for urinary incontinence in women: The incontinence impact questionnaire and the urogenital distress inventory. *Neuroural Urodyn, 14,* 131, 139.

of the setting. By outlining the timing, amount, and type of fluid intake with the timing, amount, and continence status for each void, key data are collected to document the severity of incontinence, list any irritative or associated symptoms that are present, identify precipitating events, and detect any patterns to voiding problems (Wyman, 1994). Bladder record data may be self-reported or completed by caregivers; a bladder diary has been found to be a reliable method for assessing the frequency of voluntary voiding and involuntary incidents of urine loss (Wyman, Choi, Harkins, Wilson, & Fantl, 1988). A 3-day diary provides sufficient data to classify frequency and number of incontinent episodes (Doughty, 2000). See **Figure 12-3** for a sample voiding diary. In the clinical setting, the 3-day diary facilitated the collection of information while allowing patients the opportunity to adjust to the transfer. Patients' and caregivers' participation in the record keeping is advantageous. Many times patients or caregivers completing these records pick up patterns to the occurrence of incontinence and can begin to make positive changes.

The bladder diary is a particularly important source for data to help differentiate factors in nighttime voiding. **Nocturia**, the awakening from sleep to urinate, is a frustrating and common problem for many older persons. Nocturia may result from alterations in normal circadian rhythm of urine output, physiological changes in the lower urinary tract that interfere with storage, or may be an indication of sleep apnea (Donahue & Lowenthal, 1997; Miller, 2000; Umlauf, Burgoi, Shettar, & Pillion, 1997). Sleep apnea commonly occurs in individuals with cardiovascular disease and is the root cause of nocturia in this population. Comorbidities of diabetes mellitus and hypertension greatly increase the risk of sleep apnea (Umlauf & Chasens, 2003). Symptoms of the disorder and treatment options are discussed later in the chapter.

Measurement of volume of urine voided throughout a 72-hour period considered with the results of the physical examination and history will help determine factors contributing to nocturia, identify possible strategies for management, and indicate the need for further workup (Miller). The serious nature of sleep apnea necessitates a careful evaluation of the etiology of nocturia (Pressman, Figueroa, Kendrick-Mohamed, Greenspan, & Peterson, 1996).

Cognitive Status

A client's insight into their voiding status, recall of pertinent health information, and ability to participate in an interview are the first clues to cognitive status. Objective cognitive evaluation may be conducted with the Mini Mental State Exam (MMSE) (Folstein, Folstein, & McHugh, 1973). A more focused assessment of cognitive functioning as it relates to toileting may be accomplished in the 3-day assessment and trial for responsiveness to prompted voiding, discussed under "Interventions/Strategies for Care." The level of severity of cognitive impairment alerts health care professionals to the client's increased risk for persistent incontinence. It also guides selection of options for the first line of intervention.

It is tempting to base the diagnosis of the type of incontinence demonstrated on the clinical signs and symptoms from the history; however, clinical symptoms alone are not sufficient to determine the pathophysiology of voiding problems (Rich & Pannill, 1999). Focused physical examination of the genitourinary, rectal, and neurologic systems is a necessary component of the basic evaluation.

Figure 12-3 A sample voiding diary.

Your Daily Bladder Diary

This diary will help you and your health care team. Bladder diaries show the causes of bladder control trouble. The "sample" line (below) will show you how to use the diary.

Your name: _____

Date: _____

Time	Drinks		Urine How much?		ACCIDENTS					
					Accidental Leaks			Did you feel a strong urge to go?		What were you doing at the time?
	What kind?	How much?	How many times?	Use measuring cups (ml's or oz's)	How much? (check one)			Circle one		Sneezing, exercising, having sex, lifting, etc.
Sample	**Coffee**	**2 cups**		**2 oz or 2 ml**	sm	med	lg	**Yes**	**No**	**Running**
6–7 a.m.								Yes	No	
7–8 a.m.								Yes	No	
8–9 a.m.								Yes	No	
9–10 a.m.								Yes	No	
10–11 a.m.								Yes	No	
11–12 noon								Yes	No	
12–1 p.m.								Yes	No	
1–2 p.m.								Yes	No	
2–3 p.m.								Yes	No	
3–4 p.m.								Yes	No	
4–5 p.m.								Yes	No	
5–6 p.m.								Yes	No	
6–7 p.m.								Yes	No	
7–8 p.m.								Yes	No	
8–9 p.m.								Yes	No	
9–10 p.m.								Yes	No	
10–11 p.m.								Yes	No	
11–12 mid								Yes	No	
12–1 a.m.								Yes	No	
1–2 a.m.								Yes	No	
2–3 a.m.								Yes	No	
3–4 a.m.								Yes	No	
4–5 a.m.								Yes	No	
5–6 a.m.								Yes	No	

Physical Examination

Aspects of a general physical examination with implications for voiding include a focused abdominal assessment, genitourinary assessment, rectal examination, and general examination to detect conditions that may contribute to incontinence such as peripheral edema, neurologic abnormalities that might suggest stroke, Parkinson's, or other neurologic disorders. Gross motor skills (e.g., locomotion, transfer skills, sitting balance), dexterity (e.g., managing buttons, zippers, and toilet paper), and the ability to communicate the need for assistance or reliably respond to verbal or written words must be assessed. Functional deficits and capabilities should be evaluated as barriers and/or assets in continence promotion. Calculating the average time it takes a patient to access a toilet and get on a commode in conjunction with a patient's ability to suppress the urge or delay voiding will help identify therapeutic interventions needed to facilitate continence, goals for the interventions, and the type of continence possible.

An initial and ongoing evaluation of hydration is essential to diagnosing dehydration and minimizing its complications, which range from the local effects on voiding from concentrated, irritative urine to more systemic problems resulting from increased confusion and lethargy that can interfere with all aspects of daily life. Physical parameters of hydration status (e.g., oral mucous membranes, sublingual saliva pool, weight changes, confusion, muscle weakness) may be masked by the deficits of stroke or treatment of concurrent health problems. Monitoring the balance between fluid intake and urine output, urine color, and the specific gravity (SG) for the second void of the day are useful indicators of fluid status. Urine tests are better predictors of a risk for or impending dehydration (Mentes). Urine SG of greater than 1.020 and a dark yellow or brownish green urine color indicate the need for increased fluid intake (Armstrong, 2000). Blood tests such as BUN/creatinine ratio, serum osmolality, and serum sodium are predictors of actual dehydration (Mentes). Using height and weight to determine body mass index (BMI) can also assist in identifying persons at risk for hydration problems (BMI <21 or >27) (Mentes). In addition, the BMI will provide an indication of the extent of obesity, which contributes to voiding problems.

In women, the pelvic examination should include assessment of the integrity of the perineal skin for lesions, irritation, or inflammation. Evidence of atrophic vaginal changes including pale, thin, dry, friable mucosa and complaints of vaginal itching, dryness, a burning sensation, and dyspareunia should be noted. Vaginal pH levels >5 in women without evidence of a vaginal infection are also indicative of poorly estrogenized tissues (Shull et al., 2000). A urethral carbuncle, a cherry-red lesion at the meatus, is another indicator of estrogen deficiency. Atrophic urethritis and vaginitis contribute to urgency and stress leakage and may be treated with topical estrogen therapy. Women should also be checked for pelvic organ prolapse; prolapse beyond the introitus or that is symptomatic should be referred for further evaluation and treatment. Multiple types and sizes of pessaries are available for correction of prolapse. In men, examination of the external genitalia should include inspection of the skin, location of the urethral meatus, and retractability of the foreskin, if present.

An evaluation of the strength of the pelvic floor muscles is an important component of the examination. However, consideration must be given to the appropriateness of performing an

invasive, potentially uncomfortable and embarrassing digital examination, particularly in frail older women or moderately to severely cognitively impaired elders. Lekan-Ruteledge (2004) explains this decision as distinguishing the "nice to know" and "should know" information versus the "must know" information by determining if the data are essential to developing the treatment plan. If the individual is capable of learning pelvic muscle exercises, adhering to an exercise regimen, and using the pelvic muscles to inhibit an urge or suppress urine flow, a digital examination may be needed to evaluate pelvic muscle control.

In the pelvic exam, a gloved, lubricated finger is inserted into the vagina and the patient is instructed to contract her pelvic floor muscles against the examiner's finger. One or two fingers are placed in an anterior-posterior plane. The Digital Rating Scale, presented in **Table 12-8**, has been found to be a reliable and valid tool to evaluate pelvic muscle strength in women (Brink, Sampselle, Wells, Diokno, & Gillis, 1989). This evaluation also provides key information on the patient's ability to isolate and identify the correct muscles. The strength and duration of contraction of the muscles also may be evaluated rectally in women with vaginal stenosis and in men. If the vaginal exam is not indicated, proceed to the rectal examination.

The rectal examination provides information about the integrity of sacral innervation, pelvic muscle strength, and the presence of a fecal impaction. Resting and active anal sphincter tone is assessed. The ability to voluntarily contract the anal sphincter indicates a functional pelvic floor and intact innervation to the pelvic floor. The presence of sensation of the perineum indicates intact sacral nerve roots for the external urethral and anal sphincter (Schull et al., 2000). This is a particularly important evaluation in diabetics who may experience neuropathy that interferes with normal sensory input, which can result in overdistention and urinary retention.

The digital rectal examination (DRE) is an essential component of the incontinence assessment. In men, the prostate may be palpated proximal to the internal anal sphincter through the anterior rectal wall, noting size, consistency, and tenderness. It must be remembered that

Table 12-8 Digital Rating Scale

Pressure	Duration	Displacement of Vertical Plane
1 = No response 2 = Weak squeeze; felt as a flicker at various points along finger surface, not all the way around 3 = Moderate squeeze; felt all the way around the finger surface 4 = Strong squeeze; full circumference of fingers compressed	1 = None 2 = <1 second 3 = 1–3 seconds 4 = >3 seconds	1 = None 2 = Fingertips may move anteriorly 3 = Whole length of fingers move anteriorly 4 = Whole fingers move anteriorly, are gripped and pulled in.

Source: Brink, C. A., Sampselle, C. M., Wells, T. J., Diokno, A. C., & Gillis, G. L. (1989). A digital test for pelvic muscle strength in older women with urinary incontinences. *Nursing Research 38*(4), 196–199.

prostate size does not correlate well with bladder neck obstruction. During the DRE, strength of the pelvic floor muscles is evaluated and the rectal vault is assessed for the presence of large caliber, hardened stools that suggest constipation or impaction. An impaction must be treated prior to initiating a bladder program.

The abdomen is palpated for tenderness, fullness, or masses that may be indicative of fecal impaction. Bowel sounds are auscultated to evaluate bowel motility. The suprapubic area should also be palpated to detect bladder tenderness or distention.

Difficulties starting the urine stream, intermittent flow, strength of the urine stream, and the presence of postvoid dribbling may be determined in the interview but also may be evaluated directly. The measurement of postvoid residual urine volume (PVR) is recommended in the basic evaluation. PVRs are measured by catheterization or noninvasively with a bladder scanner within a few minutes of voiding. A portable bladder ultrasound is a useful indicator to determine the ability to empty the bladder. The bladder scan's reliability and validity are supported in evaluations in the frail elderly with PVR volumes $\geq$ 150 cc (Borrie et al., 2001). The AHCPR guidelines state that in general, PVRs $<$ 50 cc are considered normal, whereas volumes over 200 cc indicate incomplete emptying. Adding the volume voided and the PVR volume will provide an indication of total bladder capacity.

Urinalysis by dipstick or laboratory testing is a component of the initial evaluation of incontinence. Urine is checked for white blood cells, nitrites, glucose, and blood. Hydration status can also be evaluated with some chemical strips. A UTI should be treated prior to initiation of other treatment for UI. Treatment of a UTI may result in an improvement or resolution of urine leakage, frequency, and/or urgency.

Environmental Resources

The environment must be evaluated as a factor in the development and treatment of urinary incontinence. Structural characteristics; the number, location, and accessibility of toileting facilities; the availability of physical assistance; and adaptive equipment/supplies for toileting are major considerations (Wyman, Elswick, Ory, Wilson, & Fantl, 1993). Environmental characteristics of the hospital and potential discharge destinations must be evaluated and compared in the assessment phase. The results should be integrated into the treatment plan to guide the selection and implementation of interventions in order to achieve the optimal level of continence at home.

Goals for Treatment of UI

The goals of treatment for incontinence and the outcomes for evaluation must be addressed and clarified to assist in determining the types of interventions that should be implemented. Understanding the patient's expectations for treatment outcomes and physical abilities provides direction for intervention. The goals of those seeking treatment for incontinence and the conditions for satisfaction with outcomes are multidimensional and do not necessarily require total continence (Sale & Wyman, 1994).

Continence takes several forms, depending upon the conditions or external resources involved in achieving control (Fonda, 1990). Control of voiding occurs on various levels, extending from the loss of control (incontinence) to **independent continence** (control based on the competence of the individual and not requiring the assistance of others). **Dependent conti-**

Box 12-16 Preventing UI through Healthy Bladder Habits

Encourage all clients to practice healthy bladder habits to minimize their risk for developing UI by reviewing the following strategies:

1. Maintain hydration.
2. Avoid bladder irritants.
3. Empty the bladder on a regular schedule.
4. Avoid constipation.
5. Strengthen and tone the pelvic floor muscles.

nence requires the physical assistance of and/or reminders from others to maintain continence. **Social continence** refers to situations in which continence cannot be achieved, but urine leakage is contained to maintain dignity and comfort. A category of **partial continence** denotes those situations in which a caregiver's assistance is helpful in achieving continence but is not required all of the time (Palmer, 1996). The effectiveness of interventions can be evaluated more accurately by specifying the level of continence achieved through these categories as opposed to the traditional designation of continent and incontinent. Determination of the effectiveness of the urinary continence promotion intervention must include the degree to which the incontinent individual's personal goals for treatment were met as well as objective measures of changes in the severity of incontinence and occurrence of complications associated with incontinence. The type of continence achieved also must be specified.

Interventions/Strategies for Care

Guidelines for the treatment of different types of UI in specific populations have been developed by national and international panels based on extensive reviews of the literature (Abrams, Khoury, & Wein, 1999; Fantl et al., 1996). The three primary categories of treatment for urinary incontinence are behavioral therapy, pharmacological intervention, and surgery.

Behavioral management refers to interventions that modify the patient's behavior or environment. Strategies included in a behavioral approach are scheduling regimens, relaxation exercises, urge suppression techniques, and pelvic muscle exercises (PME), with and without the addition of biofeedback, vaginal cones, and electrical stimulation as adjunct to the exercises. Pharmacological treatment involves medications that alter detrusor muscle activity or bladder outlet resistance. Surgical interventions primarily are used to increase bladder outlet resistance and relieve UI and intrinsic sphincteric deficiency or remove a bladder outlet obstruction, relieving overflow incontinence (Fantl et al., 1996).

Behavioral Approaches

Behavioral approaches are recommended as the first line of treatment for urinary incontinence. The clinical practice guidelines identify dietary modifications (hydration and avoidance of bladder irritants), scheduled voiding, prompted voiding, bladder training protocol, pelvic muscle rehabilitation, and urge suppression techniques as first line approaches in a comprehensive treatment regimen for UI (Abrams et al., 1999; Fantl et al.).

Behavioral strategies differ in their mechanisms of action, the level of patient participation

required, and technology involved. The interventions are selected for an individual based on the type of incontinence, the mental and physical abilities and limitations of the individual patient, and the environmental resources available (Burgio & Burgio, 1986). The versatility of behavioral therapy enables the care providers to adapt and individualize a treatment plan according to the patient's level of functioning. It also allows changes in treatment approaches that reflect and are congruent with changes in a patient's functional status resulting from recovery and rehabilitation. If successful, behavioral approaches eliminate the added expense and potential risk to health and well-being of an adverse drug reaction from pharmacological intervention and the complications associated with surgery.

Eliminating reversible factors is a first step in treatment in order to optimize urological functioning and the patient's ability to respond favorably to interventions. The results of the evaluation will identify actual or potential risk problems that must be addressed to minimize, prevent, or resolve their occurrence. Of particular concern initially is maintaining hydration, promoting regular bowel function, and removing an indwelling urinary catheter while ensuring the bladder empties completely on a regular basis.

Hydration management focuses on maintaining fluid balance. Ensuring an adequate, timely, appropriate fluid intake has long been recognized as essential to a successful continence program. An individualized fluid goal must first be determined. The standard suggested by Skipper (1993) has been suggested as preferable (Mentes et al., 1998). To calculate fluid intake according to this standard, take 100 mg/kg for the first 10 kg of weight, 50 ml/kg for the next 10 kg, and 15 ml for any remaining kg (Skipper, 1993). Because this includes fluid from all sources, to determine the goal for fluid intake alone, 70% of the total volume is used (Mentes et al., 1998). Providing fluids throughout the day will help assure the fluid goal is met and minimize frequency and urgency that may result from a rapid filling of the bladder from the ingestion of a large volume of intake over a short period. The University of Iowa evidence-based protocol for hydration management suggests delivering 75%–80% of fluid at meals and 20%–25% during nonmeal times, such as with medications and planned nourishment (Mentes, 1998). This schedule offers the additional advantage of ensuring supervision is available (if necessary) for patients with swallowing problems. Fluid rounds mid-morning and mid-afternoon, in conjunction with offers of assistance with toileting, have been effective in reducing incontinence in bedfast elderly nursing home residents and decreasing dehydration (Spangler, Risley, & Bilyew, 1984). Fluid breaks can be incorporated into the daily routine. Planned refreshment breaks in a residential program or facility that provide socialization, fluids, and nourishment could be useful and enjoyable opportunities to meet physical and social needs. Fluids should be limited after supper, especially if nocturia is present.

A final consideration in fluid intake concerns the type of fluids consumed, which should be limited to those without a diuretic or irritant effect that provide the appropriate consistency to prevent choking or aspiration. Many common beverages may be irritating to the bladder, causing or contributing to urgency. Carbonated and caffeinated beverages, citrus juices, and aspartame are among the products commonly considered to be bladder irritants. A review of the

bladder diary is especially useful in detecting possible agents that precipitate urgency or incontinence. Reducing the intake of caffeinated beverages to two or fewer servings a day is generally recommended for individuals experiencing urgency or urge incontinence (Arya et al., 2000). Postum and sun teas are potential alternatives for coffee and tea, respectively. However, water is the better choice of a liquid. Water is not an irritant or diuretic and will not interfere with diabetic control. If swallowing problems exist, nectars and thick liquids such as buttermilk and V-8 juice are acceptable if a mild thickened liquid is needed, according to Cardinal Hill Rehabilitation Hospital. Any liquid may be thickened with commercial products or by mixing it with natural thickeners such as baby food, mashed bananas, or wheat germ (Kain, 2001).

Hydration status should be evaluated on an ongoing basis. A color chart, developed and tested by Armstrong (1998), may be particularly helpful in teaching patients and/or caregivers a simple way to self-monitor adequacy of fluid intake. (The color chart is available in the Armstrong text (2000), *Performing in Extreme Environments*, or may be obtained with the Evidence-Based Hydration Management Protocol from the University of Iowa.)

Maintaining bowel regularity prevents the potential interference with bladder emptying that may result from constipation and promotes fecal continence. Irregular bowel habits, immobility, dehydration, decreased fiber intake, and emotional factors contribute to the development of constipation. Many hospitalized patients identify the lack of privacy and change in daily routines as major factors in their constipation. Planning a set time for defecation consistent with a patient's usual routine had the greatest efficiency and effectiveness for bowel training after stroke when compared in an evaluation of bowel programs differing in the time of day scheduled for bowel training and use of suppositories (Venn, Taft, Carpentier, & Applebaugh, 1992). Maintaining hydration is critical in promoting bowel function as well as bladder activity and has been discussed. The addition of fiber with adequate fluids should be considered if stools are hard. A mild stimulant such as prunes or prune juice 6–8 hours prior to planned defecation may be indicated for hard stool that is difficult to pass. A mixture of applesauce, prune juice, and bran has been effective in decreasing constipation and for laxative use in nursing home patients (Smith & Newman, 1989), and has application in the treatment and prevention of constipation in at-risk patients (see **Table 12-9**). Its thick texture may facilitate administration to patients with swallowing problems. The use of regular grocery store items to prepare the mixture should decrease the overall cost of the bowel program when compared to prescription or over-the-counter products.

Prompted voiding (PV), an intervention to treat a patient's inability to recognize and act on

Table 12-9 Bran Mixture Recipe for Treating or Preventing Constipation

1 c. applesauce
1 c. unprocessed coarse wheat bran
$^1/_2$ c. unsweetened prune juice

Mix together. Give 2 T a day with a glass of water or juice. May increase to 3 T twice a day gradually (weekly) until good bowel function is achieved. May be given in hot cereal or added to mashed bananas. Refrigerate the recipe.

the sensation of the need to void and exert neuromuscular control over initiation of voiding, has been successful in decreasing the frequency of UI in clinical trials with physically and cognitively impaired nursing home residents (Colling et al., 1992; Fantl et al., 1996; McCormick et al., 1990; Schnelle, 1990). It also has been shown to be effective in home settings (Adkins & Matthews, 1997). Persons with urge, stress, and mixed UI have responded positively to this intervention (Ouslander et al., 1995; Schnelle, 1990). Prompted voiding also has strong support for reducing UI in individuals with cognitive and physical deficits (Abrams, Khoury, & Wein, 1999; Fantl et al., 1996; Heavener, 1998).

Prompted voiding is a scheduling regimen that initially focuses on the caregiver's behavior in order to change the incontinent person's voiding behavior. PV involves the consistent use of three caregiver behaviors: monitoring, prompting, and praising. The caregiver adheres to a schedule of regular monitoring, asking the incontinent individual if he or she needs to use the toilet, and checking to see if he or she is dry or wet. Prompting involves reminding them to use the toilet and to wait until the caregiver returns to void. Praise is the positive response or feedback for appropriate toileting or dryness. See Table 12-10 for the steps of the prompted voiding technique and associated caregiver behaviors.

Research evaluating the effectiveness of PV provides clues about the predictors of success and factors in responsiveness. The best predictor of an individual's likelihood to benefit is her or his success during a therapeutic trial (usually lasting 3 days) (Lyons & Specht, 1999; Ouslander et al., 1995). A prompted voiding trial involves assessing the patient's ability to recog-

Table 12-10 STEPS IN THE PROMPTED VOIDING PROTOCOL

1. Greet the patient by name.
   Remember to always knock for resident privacy. Close the door and/or privacy curtain.
2. Ask the patient if she or he is wet or dry. Ask a second day if the patient doesn't respond.
3. Check clothes, bedding, or body to determine if he or she is wet or dry. Tell the patient if he or she is correct.
4. If the patient asks for help in toileting:
   a. Praise the resident.
   b. Assist him or her to the toilet.
5. If the patient does *not ask* for help toileting, *you* ask the patient if he or she wants to toilet.
   a. Ask a second time if he or she doesn't say yes the first time.
   b. Ask a third time if his or her response is other than yes or no.
6. Assist to toilet only if he or she says yes to your offer.
   a. Praise for appropriate toileting.
   b. Record outcome.
7. Ask if he or she wants something to drink and provide appropriate liquids.
8. Tell the resident when he or she can expect you to be back

Source: Schnelle, J. F. (1991). *Managing Urinary Incontinence in the Elderly.* New York: Springer Publication.

nize the need to void and to respond to the need appropriately, either by asking to toilet or agreeing to toilet when the bladder is full. If the patient's percentage of appropriate toileting (number of voids in receptacle divided by total number of voids) meets the proportion specified, PV is continued. Although patients are usually checked every 2 hours initially, the pattern and volume of voids recorded guide the interval between voids and determine when the interval is changed. The reader is referred to Schnelle's (1991) text, *Managing Urinary Incontinence in the Elderly*, and the University of Iowa's research-based protocol, *Prompted Voiding for Persons with Urinary Incontinence* (Lyons & Specht, 1999) for an in-depth description of the PV protocol, suggestions for implementation, and forms for documentation. Factors possibly related to lack of success with PV include increased age, high residual urine volumes, low maximum voided volume, and a high frequency of incidents in which the person indicates the need to void and does not void (Lyons & Specht, 1999).

Bladder training focuses on the ability to delay urination and suppress urgency and is an important component for continence. Bladder training refers to a program of education, scheduled voiding, and reinforcement to provide patients with the skills to improve the ability to control urgency, decrease frequency and incontinent episodes, and prolong the interval between voiding (Wyman, 1994b).

The steps in a bladder training program include setting a voiding schedule, teaching strategies for controlling urgency, monitoring voiding, and positive reinforcement. The initial voiding schedule is determined from baseline voiding data and prescribed according to the guidelines presented in **Table 12-11**. A 5- to 10-minute window on either side of the scheduled voiding time is allowed for flexibility. The training regimen is followed during waking hours, and the time between voiding is gradually increased by 15–30 minutes until the goal interval between voiding is reached (Sampselle et al., 1997). Although a 3–4 hour voiding interval is considered a maximal goal, Wyman and Fantl (1991) report most patients best tolerate an interval of 2–2$^1/_2$ hours. Strategies to suppress urge include relaxation and distraction techniques such as slow deep breathing, concentrating on a task such as talking to someone, and pelvic muscle contractions.

Bladder training has been evaluated and implemented primarily with independent, community-dwelling elderly women. Persons with physical and cognitive impairment have been considered unlikely candidates for bladder training techniques. However, the potential benefit to voiding supports an effort to try this approach. A review of the literature on dementia and incontinence reported mobility was an important factor in the incidence of incontinence in persons with dementia (Snelley & Flint, 1995). An exercise program to improve walking in cognitively impaired nursing home residents reduced daytime incontinence (Jivorec, 1991). Providing patients the skills to delay voiding until mobility improves or until assistance for toileting can be obtained is a missing element that may decrease incontinence regardless of the level of recovery of mobility.

Another technique is **pelvic muscle rehabilitation**, which concentrates on increasing the strength, tone, and control of the pelvic floor muscles to facilitate a person's ability to voluntarily control the flow of urine and suppress urgency. The pelvic floor muscles support the pelvic organs. Pelvic muscle rehabilitation refers to an exercise regimen to improve the integrity and

Table 12-11 Steps in Bladder Training

1. Complete a 72-hour voiding diary.
2. Review the voiding diary. Calculate the number of voids and bladder accidents in a 24-hour period. Determine fluid intake.
3. Examine data for patterns. Does UI occur only during certain times of day? Are accidents associated with certain events (activities, intake of specific type of fluids, medications)? What is the average time between voids and longest interval? Are behaviors different for weekdays or weekends or workdays vs. nonworkdays or time when you are at home or out of the home?
4. Establish an initial voiding interval and consider the optimal interval to be achieved. The typical interval for adults is every 4 hours during the day; however, data suggest for older persons every 2 hours may be optimum (Wyman & Fantyl, 1991). The objective is to start the voiding routine at the interval that is comfortable to separate urgency from voiding; then, as you develop urge suppression skills, to increase the time between voiding until the goal is reached.
5. Urinate when you wake after meals, before bedtime, and at the prescribed intervals.
6. If you get the urge to void and it is too soon to void, use the relaxation technique to make the urge go away. Remember, this involves taking very slow deep breaths until the urge goes away. Relax and concentrate when doing this. Contract the pelvic floor muscles quickly 3–5 times. Relax. Contract again.
7. Void at the prescribed time even if you don't feel the need.
8. If after a week it is very easy to wait the assigned time interval, lengthen the time by 15–30 minutes.
9. Begin by only practicing this technique at home, when you are relaxed and the bathroom is nearby.
10. Fluid intake should be kept at six 8-ounce glasses per day. If you awaken frequently during the night to void, drink the majority of your 8 ounces before *6 at night*.
    Hints to remember:
    - Do not go to the bathroom before you have the urge to void.
    - *Never rush or run to the bathroom—walk slowly.*
    - Use the relaxation technique in situations that cause you to have the urge to void before the assigned time interval. For example, if you get the urge to void whenever you start to unlock your front door, stop, relax, and take three slow deep breaths to let the urge pass. Then unlock the door and walk slowly to the bathroom.
    - When you walk slowly to the bathroom, do some pelvic muscle exercises to prevent an accident.
11. Do not despair and get discouraged. In time, this will all fall into place and you will be voiding at the set time interval.

function of the pelvic floor. The proposed mechanism of action for pelvic muscle training is that strong and fast pelvic muscle contractions close the urethra and increase urethral pressure to prevent leakage. Pelvic muscle contractions may inhibit bladder contractions, helping to suppress urgency. To teach the individual to identify and isolate the correct muscles, instruct him or her to "draw in" and "lift up" the rectal/anal sphincter muscles. Patients should be instructed to lift up the perivaginal muscles and avoid contracting the abdominal, gluteal, and thigh muscles. To help

the patient avoid a bearing down motion, have him or her practice pushing down to feel what not to do. Start with contracting for two seconds, and then gradually increase the length of the contraction until a maximum 10-second hold is achieved. A repetition includes relaxing or resting the pelvic floor muscles between contractions for the same amount of time the muscle is being contracted. A typical training regimen involves 10 repetitions two to three times a day. Once the correct technique has been learned, instruct the patient to use pelvic muscle contraction to prevent urine flow. If leakage occurs with activities that increase intra-abdominal pressure, then a muscle contraction should precede the activity. If urgency is the primary problem, the pelvic floor muscles are used to suppress the urge. The **urge suppression** technique is outlined in Table 12-12.

Table 12-12 Urge Suppression Techniques

- Stop what you are doing and stay put. Sit down when possible, or stand quietly. Remain very still. When you are still, it is easier to control your urge.
- Squeeze your pelvic floor muscles quickly several times. Do not relax fully in between.
- Relax the rest of your body. Take a few deep breaths to help you relax and let go of your tension.
- Concentrate on suppressing the urge feeling.
- Wait until the urge subsides.
- Walk to the bathroom at a normal pace. Do not rush. Continue squeezing your pelvic floor muscles quickly while you walk.

Source: Fantl, J. A., Newman, D. K., Colling, J., et al. Managing Acute and Chronic Incontinence in Adults. Clinical Practice Guideline, No. 2, 1996 Update. Rockville, MD: U.S. Dept. of Health and Human Services, Public Health Service, Agency of Health Care Policy and Research. AHCPR Pub-No. 96-0686. March 1996.

Biofeedback is an adjunct to pelvic muscle rehabilitation and bladder contraction inhibition that has strong scientific support for effectiveness with stress and urge urinary incontinence (Abrams, Khoury, & Wein, 1999; Fantl et al., 1996). In a summary paper on the use of biofeedback-assisted bladder training for urge and stress incontinence, Burgio (1990) concluded this option has particular advantages in that it is very low risk and has had no documented side effects; however, because it relies on learning new behaviors, it may have limited application in patients with cognitive impairment. Much of the initial research evaluated the effectiveness of interventions with cognitively intact, community-dwelling elderly. However, there is compelling evidence supporting the extension of research to a more cognitively impaired population.

Recent studies targeting a more vulnerable population, the homebound frail elderly, report behavioral approaches were effective in reducing UI (Bear, Dwyer, Benveneste, Jeff, & Dougherty, 1997; Engeberg, McDowell, Donovan, Brodak, & Weber, 1997). A pilot study regarding the effect of pelvic muscle exercise and prompted voiding on the frequency of UI in elderly cognitively impaired nursing home residents revealed subjects showed significant reduction in incontinence with the addition of pelvic muscle exercise (PME) to a prompted voiding regimen (Scheve, Engel, McCormick, & Leahy, 1991).

The importance of ensuring patients can appropriately and adequately perform PME cannot be overemphasized. Bump, Hurt, Fantl, and Wyman (1991) found that verbal instructions were often not sufficient for incontinent women seen in an outpatient program to perform PME. Biofeedback, either through surface electrodes or vaginal or rectal probes, provides visual and/or auditory cues to facilitate incontinent

patients' ability to isolate and identify pelvic floor muscles. It also helps decrease patients' tendency to use abdominal or gluteal muscles. In the absence of biofeedback equipment, digital checks can be used to teach and monitor ongoing performance.

The Health Care Financing Agency (HCFA) analyzed scientific data related to the use of biofeedback for treatment of stress, urge, and post-prostatectomy incontinence in a recent review of the Medicare coverage policy. A decision memorandum summarizing its findings and the recommendations of numerous professional organizations amended HCFA's policy to allow coverage for biofeedback with patients who had failed documented trials of pelvic muscle exercises or who are unable to perform PME (Tunis, Norris, & Simon, 2000). A failed trial is defined as no significant improvement after completing a 4-week period of structured, ordered pelvic muscle reeducation to increase pelvic floor strength (Norris, 2001).

Pelvic floor electrical stimulation (PFES) is another adjunct to PME. PFES refers to the application of electric current to sacral and pudendal afferent fibers via nonimplantable vaginal or anal probes (Fantl et al., 1996). Variable rates of current are used to improve urethral closure by activating pelvic floor muscles, thus exercising and strengthening the pelvic floor (Tunis, Whyte, & Bridger, 2000). PFES also can facilitate an individual's ability to identify and isolate pelvic floor musculature. The Agency for Health Care Policy and Research (AHCPR) (Fantl et al., 1996) guidelines conclude that fair research-based evidence exists that PFES decreases stress urinary incontinence in women and it may be useful for urge and mixed incontinence. The HCFA review panel concluded that PFES is effective for patients with stress and/or urge incontinence, and considers its use as necessary and reasonable if PMEs have been unsuccessful (Tunis, Whyte, & Bridger, 2000). However, the ability to passively exercise the pelvic floor makes this a potentially valuable treatment for individuals unable to perform the exercises.

Pharmacological Management

Medications are available to help treat stress and urge incontinence. Because many older persons have multiple chronic health problems, medications for incontinence should be considered primarily as an adjunct to other behavioral interventions. Pharmacological management of urge urinary incontinence was found to add to the effectiveness of behavioral strategies in frail older persons (Fonda et al., 2002). However, the potential for adverse reactions and added cost must be considered carefully with the patient when decisions for a pharmacological intervention are being considered.

Medications prescribed for stress urinary incontinence have targeted the internal urinary sphincter or the urethral/vaginal tissues. The alpha agonist pseudoephedrine acts at the bladder neck, increasing urethral tone, and it may decrease leakage. It is often prescribed for mild cases of stress urinary incontinence; however, its side effects of insomnia, restlessness, nervousness, headache, and potential to increase blood pressure and heart rate limit its usefulness in the older population. Duloxetine, a serotonin and norepinephrine reuptake inhibitor, increases external urethral sphincter tone and is currently under review by the Food and Drug Administration for treating stress urinary incontinence. Estrogen, prescribed to treat urogenital atrophy, increases stimulation of urogenital estrogen receptors and may increase urethral resistance.

Evidence of its usefulness in stress UI is inconclusive (Fantl et al., 1996). However, estrogen's effectiveness in treating atrophic tissues can help alleviate irritative symptoms of urgency, which may decrease urge UI.

Drug therapy for urge incontinence has grown over the last few years with new products on the horizon. The primary agents for uninhibited bladder contractions are anticholinergic or antispasmotics that decrease contraction of the detrusor muscle. Table 12-13 presents an overview of the medications used for urge urinary incontinence.

Overflow incontinence in men that is the result of bladder neck obstruction from benign prostatic hypertrophy (BPH) may resolve with treatment of the prostrate. Alpha antagonists (doxazosin, tamsulosin, and terazosin) relax the urinary sphincters, improving urine flow and decreasing urine retention and overflow incontinence. However, dizziness and orthostatic hypotension are potential side effects that must be addressed. Another option for BPH treatment are the 5-α reductase inhibitors finesteride and dutasteride. This class of medications blocks the conversion of testosterone to dihydrotestosterone, the form needed for prostate growth. The 5-α reductase inhibitors take about 3 to 6 months to take effect. An important consideration in the prescription and administration of these drugs is their teratogenic effects.

Devices and Products

One of the first decisions made in the management of UI is the choice of protective undergarments. A variety of absorbent products are now available to contain urine. It is important that patients use products designed for urine; menstrual pads, a popular choice, are not specifically designed to absorb and contain urine. The absorbent inner core of continence garments wicks the urine away from the skin and allows urine to spread throughout the entire pad, increasing the volume of urine absorbed (Newman, 2002). The volume of urine that needs to be contained and the need for help toileting are important considerations in product selection. The use of pad and pant sets developed for men and for women offers several advantages to the traditional adult diaper. These garments are easier to manipulate to prepare for toileting and for repositioning clothing afterwards. They also are more in line with usual or "normal" underclothes, facilitating the expectation of a return to continence and promoting comfort. The introduction of products to accommodate moderate to heavy levels of incontinence has broadened the possibilities for successful containment. Many patients and family have been relieved (especially from an economic perspective) to learn of the availability of nondisposable garments that can be washed and reused.

New and improved products are in the planning and production stages (Mueller, 2004) and will increase the options for management and decrease the control that incontinence and the fear of incontinence exerts over an individual's life. Toileting equipment and collection devices are available for men and women to promote self-toileting, including female urinals, wheelchair urinals, and male reusable urinal/pant garments. The National Association for Continence (2004) Resource Guide is an excellent resource for all products and their manufacturers and is available for a nominal fee (National Association for Continence, P. O. Box 8310, Spartanburg, SC 29305-8310; Phone (800) BLADDER or (800) 252-3337; Web site: www.nafc.org).

Table 12-13 MEDICATIONS COMMONLY USED TO TREAT URINARY INCONTINENCE*

Medication	Dosage	Evidence	Comments
Predominantly Anticholinergic or Antimuscarinic Effects			
Hyoscyamine	0.375 mg twice daily orally	2/D	Also available in sublingual and elixir forms; it has prominent anticholinergic side effects
Oxbutynin	2.5–5.0 mg thrice daily orally (short-acting) 5–30 mg daily orally (long-acting) 3.9 mg over a 96-hr period (transdermal)	1/A	Long-acting and transdermal preparations have fewer side effects than short-acting preparations The transdermal patch can cause local skin irritation in some patients
Propantheline	15–30 mg 4 times daily orally	2/B	Prominent anticholinergic side effects
Propiverine	15 mg thrice daily orally	1/A	Complex pharmacokinetics with several active metabolites; not currently available in the United States
Tolterodine	1–2 mg twice daily orally (short-acting) 4 mg daily orally (long-acting)	1/A	The long-acting and short-acting preparations have similar efficacy
Trospium	20 mg twice daily orally	1/A	Quaternary ammonium compound, which does not cross the blood–brain barrier and may have fewer cognitive side effects than other anticholinergic agents; not currently available in the United States
Estrogen (for women)			
Vaginal estrogen preparations	Approximately 0.5 g cream applied topically nightly for 2 wk, then twice per week Estradiol ring, replaced every 90 days Estradiol, 1 tablet daily for 2 wk, then 1 tablet twice a week	4/D	Local vaginal preparations are probably more effective than oral estrogen; definitive data on effectiveness lacking

Alpha-Adrenergic Antagonists (for men)			
Alfuzosin	2.5 mg thrice daily orally	4/D*	Useful in men with benign prostatic enlargement
Doxazosin	1–16 mg daily orally		
Prazosin	1–10 mg twice daily orally		Postural hypotension can be a serious side-effect
Tamsulosin	0.4–0.8 mg daily orally		
Terazosin	1–10 mg orally each day at bedtime		Doses must be increased gradually to facilitate tolerance
Other drugs			
Imipramine	10–25 mg thrice daily orally	2/C	May be useful for mixed urge-stress incontinence; can cause postural hypotension and bundle-branch block
Desmopressin	20–40 pg of intranasal spray daily at bedtime 0.1–0.4 mg orally 2 hr before bedtime	1/B	Intranasal spray used for primary nocturnal enuresis in children; hyponatremia occurs commonly in older adults, and serum sodium levels must be monitored closely

**Not all drugs listed in this table have proven efficacy specifically for symptoms of overactive bladder.*

†Levels of evidence are based on the Oxford System: A score of 1 indicates evidence from randomized, controlled trials; a score of 2, evidence from good-quality prospective cohort studies; a score of 3, evidence from good-quality retrospective case-control studies; and a score of 4, evidence from good-quality case series. The grade of recommendations is based on the definitions used by the International Consultation on Urological Diseases: A indicates consistent level 1 evidence; B, consistent level 2 or 3 evidence or major evidence from randomized, controlled trials; C, level 4 evidence or major evidence from level 2 or 3 studies or expert opinion based on the Delphi method; and D, inconclusive, inconsistent, or nonexistent evidence or evidence based on expert opinion only.

‡The rating is for symptoms of overactive bladder, not for overall symptoms of benign prostatic hyperplasia.

Source: Ouslander, J. G. (2004). Management of the overactive bladder. *NEJM, 350,* 786–799.

Case Study 12-1

Mr. C., an 81-year-old widower, is admitted for stroke rehabilitation. He underwent a cystoscopy and transurethral resection of the prostrate (TURP) for benign prostatic hypertrophy (BPH) a week ago. After the procedure he experienced a hypotensive episode and mental status changes. A work-up revealed a large left middle-cerebral artery stroke. His stroke deficits include expressive aphasia, left neglect, dysphagia, and left hemiplegia. Concurrent health problems include coronary artery disease, hypertension, and hyperlipidemia under good control prior to surgery. Prior to transfer, Mr. C. had a low HCT and hemoccult-positive stool and received a blood transfusion. He was also suspected to have pneumonia and was started on an antibiotic.

On examination, Mr. C. is noted to be thin, pale, and lethargic. He has a weak cough, facial weakness, and a mild case of thrush. An indwelling urinary catheter is draining amber urine. Nonpitting edema is noted in his right hand; his arms have multiple bruises and dry, flaky skin. The transfer report indicates he requires minimal assistance with bed mobility and moderate assistance with transfers including toilet transfers; his sitting balance is fair; and he can self-propel his wheelchair 150 ft. with standby assistance. His son and daughter live out of town and have had to return home. They were not able to accompany him at transfer and will not be able to visit until the weekend (4 days from now).

Orders on admission include: a pureed texture diet with moderate thick liquids; Isosource 1.5 1-1/2 cans at 0800 and 1600 and 1 can at 1200 and 2000 with 325 cc free water flush every shift via PEG tube. One scoop of benefiber is added to tube feeding three times a day. His medication orders include: Tenormin, 25 mg once a day; Lipitor, 20 mg at bedtime; Prevacid, 30 mg once a day; ASA, 81 mg once a day; Plavix, 75 mg once a day; amiodarone, 200 mg once a day; and clindamycin, 600 mg three times a day.

1. Mr. C. presents multiple challenges. Which of the common health problems discussed in the chapter are relevant to his nursing care?
2. What are the priorities for Mr. C.'s care plan during his first week of rehabilitation?
3. What are key interventions to promote recovery and prevent complications?

After 3 days the physician orders to discontinue his indwelling catheter. He experiences frequency, urgency, and

incontinence. He has developed symptoms of an allergy—suffering from runny nose and dry cough. His tube feeding is being decreased as his dietary intake increases. When his family arrives, they ask about putting him on that medicine advertised on TV for overactive bladder and bring his OTC allergy medicine (Sudafed) for his cold. They also bring him his favorite soda.

4. How would you respond to the family?
5. What actions would you take to address the problems and concerns raised?
6. How would your goals for care evolve over the next weeks of his stay?
7. What interventions would you institute to prevent the development of common health problems during his hospitalization and upon return to the community?

Meticulous skin care is essential in the care of persons with incontinence. Moisture barriers and no-rinse incontinence cleansers have been shown to be more effective than soap and water alone in preventing skin breakdown (Byers, Ryan, Regan, Shields, & Carta, 1995). It is important to gently dry the skin after cleaning and apply moisturizers. Petroleum-based products may be incompatible with some adult briefs, causing skin irritation (Newman, 2002).

Indwelling urinary catheters, once the primary means for managing urinary incontinence, are no longer accepted as the first step in an incontinence treatment regimen. However, there are situations that may require catheter use. The Agency for Health Care Policy and Research identified guidelines for long-term indwelling catheter use (see **Table 12-14**). With long-term use, care must be taken to monitor for common complications of polymicrobial bacteruria (universal by 30 days), fever (1 event per 100 patient days), nephroliathisis, bladder stones, epididymitis, and chronic renal inflammation and pyelonephritis (Fonda et al., 2002). Maintaining hydration, urine flow, and cleanliness of the system are important components of care. Minimizing urethral trauma by

Table 12-14 AHCPR Guidelines for Long-Term Indwelling Catheter Use

- For patients whose incontinence is caused by obstruction and no other intervention is feasible
- For terminally ill, incontinent patients
- Short-term treatment for patients with pressure ulcers
- For severely impaired individuals in whom alternative interventions are not an option
- For patients who live alone and do not have a caregiver to provide other supportive measures

Source: Fantl, J. A., Newman, D. K., Colling, J., et al. Managing Acute and Chronic Incontinence in Adults. Clinical Practice Guideline, No. 2, 1996 Update. Rockville, MD: U.S. Dept. of Health and Human Services, Public Health Service, Agency of Health Care Policy and Research. AHCPR Pub-No. 96-0686. March 1996.

using small-caliber catheters, a 5 cc retention balloon filled with 10 cc of sterile water, and securing the catheter with a thigh strap will promote comfort and may help decrease complications. Emptying the catheter every 4–6 hours to avoid migration of bacteria up the lumen, cleaning the insertion site gently with soap and water daily, and avoiding irrigations may help decrease symptomatic urinary tract infection. Whenever a patient's status changes, such as when pressure ulcers heal or caregivers are available, then a trial without the indwelling catheter should be considered.

Intermittent urinary catheterization is another supportive measure to manage urinary retention (Fantl et al., 1996). In and out catheterization allows regular bladder emptying. Regular emptying reduces pressure within the bladder and improves circulation to the bladder wall, making the mucosa more resistant to infection (Newman, 2002). Sterile technique (ISC) is used in institutions, and clean technique (ICC) is used for catheterizations at home. No studies have been conducted comparing the use of intermittent urinary catheterization and long-term indwelling urinary catheterization in the frail elderly (Fonda et al., 2002). Dexterity and mobility problems may interfere with self-catheterizations. Comfort with intermittent catheterizations is a factor in ISC and ICC performed by caregivers.

Urinary incontinence is a serious, potentially disabling, complication. Incontinence is a common condition in the older population. The introduction of early targeted behavioral interventions should improve urological functioning and limit the impact of uncontrolled incontinence on quality of life. Older patients and their caregivers must be provided the skills—both technical and intellectual—to prevent the development and persistence of elimination problems. These skills are important components in the treatment of sleep problems precipitated by voiding problems.

Sleep Disorders

Sleep is considered a time of restoration for our bodies and minds. Sleep is necessary to heal wounds, maintain normal hormonal function, and provide sound emotional health. Disruptions in sleep of the older adult can worsen chronic illnesses and exacerbate depression. It is necessary for the nurse to understand the normal changes of sleep patterns in the older adult and recognize sleep abnormalities that can negatively impact health.

Sleep Changes Associated with Aging

A sleep cycle consists of two distinct components, **nonrapid eye movement (NREM) sleep** and **rapid eye movement (REM) sleep**. NREM is composed of four stages, beginning with Stage I, which is a transitional period of very light sleep. The individual is easily aroused during this stage and may deny having been asleep. Stage I usually lasts less than 7 minutes. This is followed by stage II, a period of deeper relaxation and light sleep. Stage II is the most predominant NREM stage in older adults. Stages III and IV are deeper, more restorative periods of sleep. During these stages, there is a decrease in pulse, blood pressure, and metabolism. Stage IV restores the individual physically, and tissue healing occurs during this time. However, Stage IV is the most sensitive to advancing age and begins to decrease during the third decade of life (Honkus, 2003).

REM sleep follows the four stages of NREM, and during REM the body is in the deepest state of relaxation. Large muscles become immobile and the individual is unable to move. However, the autonomic nervous system is very active, and respiratory rate, blood pressure, and heart rate become erratic and frequently elevated. Brain wave activity patterns are similar to those of wakefulness (Hoffman, 2003). REM sleep is the stage of sleep in which dreams occur. It is thought that REM is a time of mental and emotional restoration.

The sleep cycle, usually about 90 minutes long, begins with NREM I, then progresses through NREM II–IV. The individual may return to NREM III and II, then begin REM sleep. After REM sleep, the sleep pattern returns to Stage II. The smallest amount of REM occurs during early cycles and increases with each subsequent cycle through the night. This cycle repeats throughout the night, and the time spent in each stage varies, depending on the individual's age and other factors. When a person is awakened, the sleep cycle always returns to Stage I, and the process begins all over again. Therefore, individuals who awaken frequently spend much less time in the restorative phases of sleep.

The older adult spends more time in Stage II, takes longer to fall asleep, and is awakened more easily. Sleep can be significantly disrupted in individuals with cardiovascular disease, stroke, endocrine disorders, depression, and Alzheimer and Parkinson's diseases. Recent research reveals that prolonged sleep deprivation can lead to cardiovascular, neuroendocrine, and immune system disorders.

The circadian rhythm that regulates sleep is governed by the suprachiasmatic nucleus (SCN) in the hypothalamus. The SCN responds to transmissions from photoreceptors in the retina that travel along the optic nerve. Most individuals' biological clocks are on an innate 25-hour cycle. Sunlight or other bright light resets the SCN and our circadian rhythm follows the 24-hour cycle of the sun instead of the innate cycle (Medical College of Wisconsin, 1999).

Melatonin is a hormone produced by the pineal gland at night. It is released in response to darkness and inhibits neurotransmitters involved in arousal. Individuals who are exposed to bright lights 24 hours a day can experience a total cessation of melatonin release, and subsequent disruption of the sleep cycle. This lack of sleep can lead to delirium in the older adult. It is important that nurses pay close attention to the client's nighttime environment, and turn off the lights.

Prevalence of Sleep Disturbances

Sleep difficulties become more prevalent with age. According to the National Sleep Foundation's 2003 Sleep In America poll, 26% of adults aged 44–65 and 21% of adults over the age of 65 rated their sleep as fair or poor. Common sleep complaints in the older adult include frequent awakenings during the night, early morning awakenings, and difficulties falling asleep at night (**Table 12-15**). Those with chronic illnesses tend to have a greater propensity for sleep disturbances. Nearly 80% of men and women over the age of 70 have at least one chronic disease, and those with four or more comorbid conditions are considerably more likely to have sleep disturbances. Individuals with multiple illnesses rate their sleep as being of poorer quality. They sleep less hours, awaken more frequently, report difficulty falling asleep, awaken earlier, and

Table 12-15 Sleep Problems in the Older Adult

Condition	Description/Significance	Incidence
Sleep disorders—combined	Insomnia, snoring, breathing pauses, or restless legs	55–64 years old: 71% 65–74 years old: 65% 75–84 years old: 64%
Insomnia	Difficulties falling asleep or staying asleep, waking up early or unrefreshed	55–84 years old: 48%
Snoring	Symptom of sleep apnea	55–84 years old: 32%
Breathing pauses	Symptom of sleep apnea; observed or experienced	55–84 years old: 7%
Tingling and discomfort in legs	Symptom of restless leg syndrome	55–84 years old: 17%

Source: Adapted from Sleep American Poll 2003, National Sleep Foundation.

report more significant daytime sleepiness than those with three or fewer medical conditions. The conditions that negatively impact sleep include hypertension, cardiovascular disease, arthritis, diabetes, cancer, stroke, depression, osteoporosis, and respiratory diseases (National Sleep Foundation, 2003).

Insomnia

Insomnia, or difficulty falling and staying asleep, is more prominent in women. Genetic and environmental factors contribute to insomnia. First-degree relatives of insomniacs have an increased frequency of the disorder. Noise and unfavorable room temperature can contribute to insomnia (Asplund, 1999). Treatment may include benzodiazepines, hypnotics, or antidepressants.

Sleep Apnea

Periods of breathing cessation are the hallmark of **sleep apnea**, and snoring may be present in the individual with this disorder. Sleep apnea can be caused by a central nervous system control mechanism disturbance (central sleep apnea, CSA) or by the narrowing or loss of tone in the pharyngeal airway (obstructive sleep apnea, OSA). During these episodes of apnea, the soft structures of the throat relax and the airway is closed off. Oxygen levels decrease, carbon dioxide increases, and the blood becomes more acidic. The heart rate drops and the brain erroneously interprets the changes as a fluid overload. Hormones are released that awaken the individual and signal the body to get rid of fluid and sodium. Other symptoms usually present with apnea include snoring, restless sleep, and morning headaches. Both forms can result in severe sleep fragmentation, significant daytime sleepiness that interferes with daily life, and an increase in the incidence of several diseases (Asplund, 1999).

Consequences of sleep apnea include hypertension, coronary artery disease, myocardial infarction, pulmonary hypertension, CHF, stroke, neuropsychiatric problems, cognitive impairment, sexual dysfunction, and injury due to accidents (National Commission on Sleep Disorders Research, 1993). Even among healthy adults, a higher risk of death exists in

those with longer sleep latencies and poorer sleep quality (Ryff, Singer, & Love, 2004). Nearly 60% of individuals with cardiac disease also have sleep apnea (Anderson, 2004). Patients with sleep apnea have twice the risk of hypertension, three times the risk of coronary artery disease, and a four-fold risk of stroke when compared to national disease prevalence (Chasens, Weaver, & Umlauf, 2003). There is evidence that chronic partial sleep loss, such as delayed onset or frequent awakenings, is more detrimental than short-term total sleep deprivation (Bryant, Trinder, & Curtis, 2004). Poor sleep has been linked to poor memory and work performance, compromised interpersonal relationships, and a diminished quality of life (Cheek, Shaver, & Lentz, 2004). Patients with CHF and untreated sleep apnea consume twice the health care resources as patients with CHF who seek treatment for sleep apnea (Anderson). Sleep loss has been shown to have a significantly negative impact on memory retention of new skills, such as those learned in the occupational therapy sessions during rehabilitation (DeGroot, Eskes, & Phillips, 2003; Ficca & Salzarulo, 2004). Individuals who exhibit symptoms of sleep apnea should be referred to a sleep center for polysomnography, an overnight evaluation of sleep events. Continuous positive airway pressure (CPAP) devices consistently improve the symptoms of sleep apnea and decrease the individual's risk of developing somatic disease.

Restless Leg Syndrome

Individuals with **restless leg syndrome** experience periodic leg movements during sleep. The most effective method of resolving restless leg movements is to get out of bed and walk around. However, this can significantly disrupt sleep. Pharmacological treatment of the syndrome includes dopaminergic drugs, dopamine agonists, and benzodiazepines (Asplund, 1999).

Sleep Assessment

A recently developed cartoon-face sleepiness scale measures sleepiness uncontaminated by emotional state or pain (Maldonado, Bentley, & Mitchell, 2004). The scale requires the client to point to a picture that most represents their perceived level of sleepiness. The pictorial scale has shown validity and reliability in assessing level of sleepiness in sleep-disordered adults, young school-aged children, and adults with low literacy levels.

The Epworth scale is a self-completion report of the likelihood of the patient falling asleep during several daytime activities (Johns, 1991). Ratings are made on a 0–3 scale (0 = never, 3 = a high chance), with an overall score range of 0–24. The Epworth scale can be used to determine if sleep interferences and frequent awakenings have an impact on daytime sleepiness, which can negatively impact performance and recall of newly learned skills (Ersser et al., 1999).

Daytime sleepiness is a direct result of sleep quality. However, many sleep problems can be a result of poor sleep hygiene, which is the measures an individual takes to promote sleep. Therefore, it is important to also measure the client's sleep habits, such as time of going to bed, rituals prior to bedtime, and established sleep environment. Sleep hygiene should be assessed as well as daytime sleepiness, depression, and anxiety, and a thorough physical examination and medication history should be completed. Many medications can interfere with sleep, and drug–drug interactions can be a contributing factor to sleep disruption.

The Epworth Sleepiness and pictorial scales are valid in differentiating sleepiness and sleep quality without influence of pain or mood state.

The pictorial scale is appropriate for clients who are unable to read, including children and clients with decreased cognition. This sleep hygiene assessment measures difficulty falling and staying asleep, daytime somnolence, and individual satisfaction with sleep. Medications that are used to induce sleep include benzodiazepines such as triazolam (Halcion), flurazepam (Dalmane), and temazepam (Restoril) or nonbenzodiazepines such as zolpidem (Ambien).

Interventions/Strategies for Care

Nursing therapeutics for sleep promotion include enhanced sleep hygiene (Cheek, Shaver, & Lentz, 2004; Hoffman, 2003), music therapy (Arand & Bonnet, 2000; Fletcher, 1986; Gagner-Tjellesen, Yurkovich, & Gragert, 2001; Johnson, 2003; Mornhinweg & Voignier, 1995), environmental restructuring to enhance sleep (Fontaine, Briggs, & Pope-Smith, 2001), aromatherapy and herbs, (Buckle, 2001; Oliff, 2004; Taibi, Bourguignon, & Taylor, 2004), and massage (Field, 1998; Richards, Nagel, Markie, Elwell, & Barone, 2003). Individuals who have delayed sleep onset tend to respond better to nursing interventions than those with sleep maintenance problems. Sleep maintenance disorders, or frequent disruptions after falling asleep due to somatic abnormalities, usually respond better to medical therapy, including CPAP and treatment of underlying causes.

Sleep Hygiene

Clients admitted to the hospital have illness and environment-related disruptions to their sleep. Nursing interventions, including medication administration, taking vital signs, and completing assessments, should be timed to allow long periods of uninterrupted sleep whenever possible. If a client must be awakened, observe for rapid eye movements. If the client is in a state of REM sleep, wait until he or she is experiencing an NREM cycle of sleep to awaken (Honkus, 2003)

Caffeine avoidance is an important measure to enhance sleep. The stimulant increases physiological arousal and prevents the onset of sleep. Caffeine has a half-life of 3–7 hours, and late afternoon to evening abstinence is recommended to avoid its invigorating effect. Alcohol can expedite sleep onset, but interrupts REM and non-REM sleep throughout the night. After alcohol metabolizes, a rebound arousal occurs that can precipitate early morning awakening. The effect can last for several nights based on the individual's metabolism. Smoking also increases awake time and causes a delayed sleep onset (Cheek, Shaver, & Lentz, 2004).

A consistent retiring and awakening time strengthens the circadian rhythm through a homeostatic mechanism and a habitual light–dark cycle exposure. Getting up at the same time each day is more important in establishing synchronization with the light–dark cycle than going to bed at the same time (Cheek et al., 2003; Hoffman, 2003).

Environmental Restructuring

Florence Nightingale was one of the first to address environmental restructuring for improved patient outcomes. She considered lighting, noise, and sensory stimulation as care aspects that could enhance or hinder recovery. Lights should be on during the day and off at night to trigger the normal sleep pattern. Fluorescent light tends to be harsh and can cause visual fatigue and headaches. Natural light through a window can help maintain the circadian rhythm. During a 1975 study of a windowless intensive care unit in Great Britain, the inci-

dence of patient delirium was twice as high as in a unit with windows. Artificial light exposure during the night causes a drop in melatonin levels after 20 minutes, and constant, high-intensity light can lead to a total cessation of melatonin production. The colors used in the environment also play a role in the sleep cycle. Nightingale also incorporated color as a therapeutic tool by using flowers. Room colors that promote sleep are soft mixed tones of blue, green, and violet without sharp contrasts. Artwork of nature scenes can decrease use of pain medication, lower blood pressure, and increase the perception of relaxation (Fontaine et al., 2001).

Environmental noise can activate the sympathetic nervous system during sleep. Sleep occurs best at noise levels below 35 decibels, and levels above 80 db are related to sleep arousals. Television and talking were the two most frequent disruptive sounds reported in a questionnaire of 203 ICU patients (Fontaine et al., 2001). Environmental "white noise" such as ocean or rain sounds or repetitive tones at 800 Hz tend to enhance sleep (Richards, 1996). Patients with sleep-onset difficulties respond better to relaxation techniques and stimulus control than do those with sleep-maintenance problems (Mantle, 1996).

Relaxation

Music therapy promotes relaxation, deceases anxiety and pain perception, improves sleep quality, and decreases heart rate and systolic pressure (Fontaine et al., 2001; Richards, 1996). Johnson (2003) studied the impact of music therapy on the sleep quality of 52 female participants. Subjects selected their own preference of music with 64% selecting soothing classical music, 19% selecting sacred music, and 10% selecting new age music.

Each morning, subjects recorded the length of time it took to fall asleep, the number of awakenings, the time they awoke in the morning, and their satisfaction with the night's sleep. Subjects took less time to fall asleep, awoke less often, and reported a quicker return to sleep after awakening. Satisfaction with sleep scores significantly increased. The music therapy became more effective with each consecutive night's use, and a peak effect was reached on the fifth day that was maintained thereafter for the study's 10-night course (Johnson, 2003). Music therapy is the most common independent nursing intervention used for sleep. It elicits the relaxation response, decreases central nervous system arousal, stimulates alpha waves, and triggers endorphin release (Gagner-Tjellesen et al., 2001).

In a systematic review of 22 research articles, Richards, Gibson, and Overton-McCoy (2000) found positive results of massage in sessions as short as 1–2 minutes. Physiologic responses to massage include decreases in heart rate, blood pressure, catecholamine and cortisol production, and muscle activity. Patients with fibromyalgia reported lower anxiety and depression, less pain and stiffness, and fewer difficulties falling asleep (Richards et al.). Field (1998) reported similar results in patients with rheumatoid arthritis. Patients in the massage group slept an average of 1 hour longer than those in the control group. A 3-minute effleurage massage can decrease autonomic arousal and cardiac load in clients with cardiovascular disorders (Gauthier, 1999).

Aromatherapy

Aromatherapy oils such as lavender, chamomile, lemon, peppermint, thyme, geranium, and eucalyptus have been reported to enhance immunity and promote relaxation. Poor industry control

and lack of standardization are safety concerns. The potential for allergic reactions also exists in patients who are taking multiple medications. Therefore, caution should be used when recommending aromatherapy in this patient population (Fontaine et al., 2001; Richards, et al., 2003).

Lavender oil has a calming effect and decreases insomnia. In a study of elderly individuals with sleep disturbance, lavender was as effective as tranquilizers (Oliff, 2004). True lavender (lavandula angustiflora) produces a sedative effect that is similar to benzodiazepines. It is considered the safest of all essential oils with no irritation or sensitivity reported at dilutions as high as 16% and no toxicity ever reported (Buckle, 2001). When lavender is inhaled (one to five drops on a tissue inhaled for 10 minutes), the molecules travel to the olfactory bulb and then to the limbic system where GABA is increased in a response similar to that of diazepam ingestion (Buckle).

Herbal Therapy

Consumers of herbal products are advised to check with the American Herbal Products Association to ascertain the credibility of manufacturers and safety of compounds. This information is available at http://www.ahpa.org/companies.htm (Taibi et al., 2004). Herbal preparations containing valerian have shown promising results in patients with autoimmune and cardiovascular conditions (Bourguignon et al., 2003; Taibi et al.). Valerian is a root extract that enhances sleep by influencing activity at GABA, adenosine, and serotonin receptors, which regulate normal sleep (Taibi et al.). Recent findings suggest that valerian promotes relaxation and increases the depth and quality of sleep. Valerian reduced objective and subjective sleep latency, improved sleep efficiency, and decreased awakenings in patients with rheumatoid arthritis when compared to placebo. Valerian may also have analgesic and spasmolytic properties that reduce pain (Bourguignon, 2003). Valerian does not produce the "hangover" effect similar to that of benzodiazepines. In a review of 28 clinical trials, there were no reported adverse effects of valerian (Taibi et al.). However, drug–drug interactions including hepatotoxicity can occur with valerian, and the herb should be used with caution in older adults.

Pressure Ulcers

Prevalence

A **pressure ulcer** is a lesion caused by unrelieved pressure with damage to the underlying tissue. Pressure ulcers have significant prevalence in older adults in the acute care setting (3%–11%), long-term facilities (24%), and the community (17%). When a stage I ulcer develops, the older adult has a tenfold risk of developing further ulcers (Dhamarajan & Ahmed, 2003). The normal skin changes associated with aging, combined with the effects of illness, contribute to the higher risk of ulcer development in the older population. Skin becomes thinner, has less collagen and moisture, and can lose the ability to protect itself against invading organisms. Blood flow to the dermis is reduced, which results in fewer nutrients reaching the skin and less waste removal. Because of this, the skin takes much longer to heal. The older adult's skin is also more susceptible to friction and shear injuries.

Implications/Relevance of Pressure Ulcers

The most significant contributor to pressure ulcer formation is the ischemia caused by unre-

lieved pressure. During this time of interrupted blood flow, the skin becomes pale, then hyperemic and blanchable. Nonblanchable erythema is the result of plasma and erythrocytes leaking into the skin tissues. Early identification and pressure-relieving interventions can reverse the effects of ischemia at this point. Once the skin integrity has been compromised, the patient is at risk for bacteremia, sepsis, osteomyelitis, and cellulitis.

Between 1.5 and 3 million people have pressure ulcers, and 1 million new cases develop each year. In the United States, the cost of medical care for pressure ulcers is $2.2–$3.6 billion annually. The prevalence of pressure ulcers in the elderly is 3%–30%, and in critically ill patients, 17%–56% (Carlson, Kemp, & Shott, 1999).

Warning Signs/Risk Factors for Pressure Ulcers

Risk factors for pressure ulcer development include advanced age, immobility, malnutrition, BMI <24, fecal incontinence, diminished level of consciousness, and impaired sensation. External factors that promote pressure ulcer development are pressure, friction, shearing, and moisture. Individuals with intact sensation and ability to move will shift their weight or change positions when pressure or friction is concentrated in an area of the body. However, if a person is immobile or has decreased sensation, the ischemia persists and pressure ulcers can develop in a very short period of time.

Box 12-17 Healthy People 2010

The Healthy People 2010 target, objective 1-16, is to "reduce the proportion of nursing home residents with current diagnosis of pressure ulcers to no more than 8/1,000 residents." The 1997 baseline data were 16/1,000 residents (www.health.gov/healthypeople).

Assessment

Risk assessments should be completed on all patients; the **Braden Scale for Pressure Ulcer Risk Assessment (Table 12-16)** is the most widely used instrument that determines risk of pressure ulcer development. The scale assesses sensory perception, skin moisture, activity, mobility, nutrition, and friction/shear. Each area is scored on a scale of 1 to 3 or 4, with a possible score of 23 points. The lower the Braden score, the higher the risk of pressure ulcer development (Braden & Bergstrom, 1987). A Braden score of 16 or less indicates a high risk of pressure ulcer development in the general population; a score of 18 or less is indicative of high risk in the older adult or persons with darkly pigmented skin.

Baseline Braden scores should be determined upon admission to the health care facility and at regular intervals or when the patient's condition changes. Hospitals and long-term care facilities should implement nursing care policies that determine the frequency of assessment.

Nursing assessment and documentation of pressure ulcers should include staging, measurement, exudate description, wound bed characteristics, pain, condition of surrounding tissue, and any undermining factors. The National Pressure Ulcer Advisory Panel (NPUAP) has defined the stages of pressure ulcers (**Figure 12-4**). Ulcers are staged once, and do not heal in a reverse fashion (for example, a Stage IV ulcer that heals is not considered a Stage I, but is referred to as a healed Stage IV ulcer). The heal-

Table 12-16 BRADEN SCALE FOR PRESSURE ULCER RISK ASSESSMENT

Sensory Perception Ability to respond meaningfully to pressure-related discomfort	1. *Completely Limited:* Unresponsive (does not moan, flinch, or gasp) to painful stimuli, due to diminished level of consciousness or sedation. OR Limited ability to feel pain over most of body surface.	2. *Very Limited:* Responds only to painful stimuli. Cannot communicate discomfort except by moaning or restlessness. OR Has a sensory impairment, which limits the ability to feel pain or discomfort over half of body.	3. *Slightly Limited:* Responds to verbal commands but cannot always communicate discomfort or need to be turned. OR Has some sensory impairment, which limits ability to feel pain or discomfort in one or two extremities.	4. *No Impairment:* Responds to verbal commands. Has no sensory deficit that would limit ability to feel or voice pain or discomfort.
Moisture Degree to which skin is exposed to moisture	1. *Constantly Moist:* Perspiration, urine, etc. keep skin moist almost constantly. Dampness is detected every time patient is moved or turned.	2. *Moist:* Skin is often but not always moist. Linen must be changed at least once a shift.	3. *Occasionally Moist:* Skin is occasionally moist, requiring an extra linen change approximately once a day.	4. *Rarely Moist:* Skin is usually dry; linen requires changing only at routine intervals.
Activity Degree of physical activity	1. *Bedfast:* Confined to bed.	2. *Chairfast:* Ability to walk is severely limited or nonexistent. Cannot bear own weight and/or must be assisted into chair or wheelchair.	3. *Walks Occasionally:* Walks occasionally during day but for very short distances, with or without assistance. Spends majority of each shift in bed or chair.	4. *Walks Frequently:* Walks outside the room at least twice a day and inside room at least once every 2 hours during waking hours.

Table 12-16 Braden Scale for Pressure Ulcer Risk Assessment (continued)

Mobility Ability to change and control body position	1. *Completely Immobile:* Does not make even slight changes in body or extremity position without assistance.	2. *Very Limited:* Makes occasional slight changes in body or extremity position but unable to make frequent or significant changes independently.	3. *Slightly Limited:* Makes frequent though slight changes in body or extremity position independently.	4. *No Limitations:* Makes major and frequent changes in position without assistance.
Nutrition Usual food intake pattern	1. *Very Poor:* Never eats a complete meal. Rarely eats more than one third of any food offered. Eats two servings or less of protein (meat or dairy products) per day. Takes fluids poorly. Does not take a liquid dietary supplement. OR Is NPO and/or maintained on clear liquids or IV for more than 5 days.	2. *Probably Inadequate:* Rarely eats a complete meal and generally eats only about half of any food offered. Protein intake includes only three servings of meat or dairy products per day. Occasionally will take a dietary supplement. OR Receives less than optimum amount of liquid diet or tube feeding.	3. *Adequate:* Eats over half of most meals. Eats a total of four servings of protein (meat, dairy products) each day. Occasionally will refuse a meal, but will usually take a supplement if offered. OR Is on a tube feeding or TPN regimen, which probably meets most of nutritional needs.	4. *Excellent:* Eats most of every meal. Never refuses a meal. Usually eats a total of four or more servings of meat and diary products. Occasionally eats between meals. Does not require supplementation.
Friction and Shear	1. *Problem:* Requires moderate to maximum assistance in moving. Complete lifting without	2. *Potential Problem:* Moves feebly or requires minimum assistance. During a move, skin proba-	3. *No Apparent Problem:* Moves in bed and in chair independently and has sufficient muscle strength to	

(continues)

Table 12-16 Braden Scale for Pressure Ulcer Risk Assessment (continued)

	sliding against sheets is impossible. Frequently slides down in bed or chair, requiring frequent repositioning with maximum assistance. Spasticity, contractures, or agitation leads to almost constant friction.	bly slides to some extent against sheets, chair, restraints, or other devices. Maintains relatively good position in chair or bed most of the time but occasionally slides down.	lift up completely during move. Maintains good position in bed or chair at all times.
			TOTAL SCORE:

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ing process is described by the Pressure Ulcer Scale for Healing (PUSH) tool, which is discussed later in the chapter.

If an eschar is present, it must be debrided before staging can occur. Prior to debridement (**Table 12-17**), the ulcer should be documented as an eschar-covered pressure ulcer. Structures beneath the epidermis and dermis, including muscle, are more susceptible to the effects of ischemia. Therefore, pressure ulcers are usually much worse than they appear on the surface, and staging should be to the maximum anatomical depth after necrotic tissue debridement is performed. The structural layers damaged by the ischemia are lost, and the defect is filled with granulation tissue.

The length, width, and depth of pressure ulcers should be measured and documented, with distinction made between healed and nonhealed areas of the ulcer. Photographs are often used to document the occurrence and healing of pressure ulcers. The quantity and characteristics of any exudates and the types of wound bed tissue (necrotic, slough, granulation) are also documented. Pain related to the pressure ulcer should be assessed using an appropriate pain scale. It is also important to identify and document effective pain relief measures and provide analgesia prior to dressing changes or other interventions.

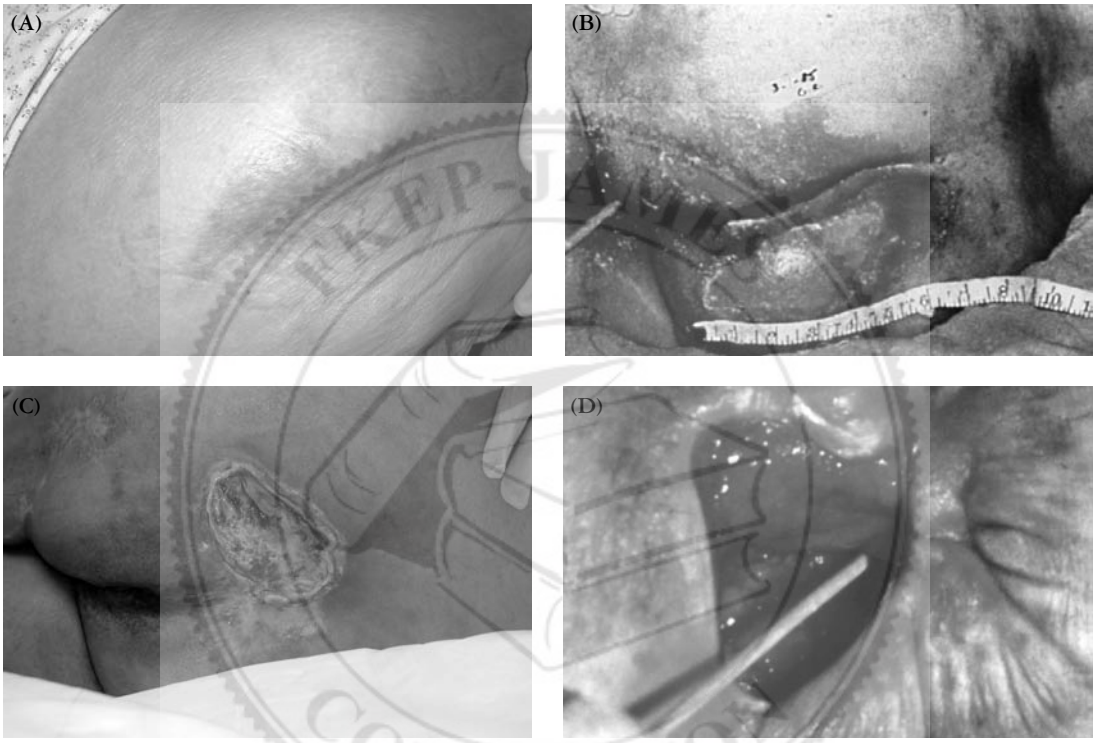
The surrounding skin should be assessed for any maceration or injury (including tape abrasions). The pressure ulcer may have undermining or sinus tracts, and the presence of these complications should be documented. Pressure ulcers with undermining or tracts often lead to further skin breakdown.

Box 12-18 Preventing Pressure Ulcers

1. Assess all clients for risk of pressure ulcer development.
2. Identify all factors of risk to determine specific interventions.
3. Inspect the skin at least daily and document results.
4. Use mild cleansing agents for bathing, avoiding hot water, harsh soaps, and friction.
5. Moisturize after bathing and minimize environmental factors that lead to dry skin.
6. Avoid massaging bony prominences.
7. Assess for incontinence. Use skin barriers after cleansing, absorbent underpads or briefs, and monitor frequently for episodes of incontinence.
8. Use dry lubricants, such as cornstarch, on transfer surfaces (linens) to prevent friction.
9. Assess for compromised nutrition, particularly protein and caloric intake. Consider nutritional supplements and support for clients at risk.
10. Maintain or improve client's mobility and activity levels.
11. Reposition bed-bound clients at least every 2 hours and chair-bound clients every hour. Patients should be instructed or assisted to shift their positions more frequently (i.e., every 15 minutes for chair-bound patients and at least every hour for bed-bound).
12. Place at-risk clients on pressure-reducing devices. (Donut devices should not be used—they simply displace the pressure and friction to the periphery of the area that is meant to be protected.)
13. Use lifting devices to transfer clients.
14. Pillows or foam wedges should be used to keep bony prominences from direct contact with each other (e.g., knees, ankles).
15. Avoid positioning the client on the trochanter when lying on his or her side. (Use a 30-degree lateral inclined position.)
16. Elevate the head of the bed at 30 degrees or less. (Shearing injuries can occur at elevations higher than 30 degrees.)
17. Evaluate and document the effectiveness of interventions, and modify the plan of care according to client response.
18. Provide education to clients, family, and caregivers for the prevention of pressure ulcers.

Source: Adapted from National Guidelines Clearing House Guideline for Prevention and Management of Pressure Ulcers (http://www.guideline.gov).

Figure 12-4 A pressure ulcer, or decubitus ulcer, develops when pressure compromises blood supply and thus oxygenation to an area of tissue. (A) Stage 1. (B) Stage 2. (C) Stage 3. (D) Stage 4.



Source: (A & C) © Chuck Stewart. (B & D) Courtesy of National Pressure Ulcer Advisory Board.

Nutrition

Nutrition is important for the client at risk and for those with pressure ulcers. Nutrients involved in wound healing include protein, arginine, zinc and vitamins A, B, and C (Mathus-Vliegen, 2004; Singer, 2002). If dietary intake is inadequate, nutritional support (tube feeding) should be used to provide approximately 35 calories/kg/day and 1.5 grams of protein/kg/day (Mathus-Vliegen). Other identified or suspected nutritional deficiencies should be corrected if possible.

Tissue Load Management

Tissue load is the distribution of friction, pressure, and shear on the tissue. Clients who develop pressure ulcers require a decreased load to the ulcerated area and provision of moisture levels and temperature that enhance healing. Avoid positioning the client on the pressure

Table 12-17 Methods of Pressure Ulcer Debridement

Sharp	Devitalized tissue is removed with a scalpel, scissors, or other sharp instrument. The most rapid form of debridement and can be used for removing areas of thick eschar.
Enzymatic	Topical debriding agents are applied to devitalized tissue areas.
Autolytic	Appropriate for noninfected ulcers only. Synthetic dressings that aid self-digestion of devitalized tissue.
Mechanical	Wet-to-dry dressings, hydrotherapy, and irrigation.

ulcer and use positioning devices to raise the area off the support surface. Pressure-reducing and pressure-relieving mattresses are available and should be used when positioning techniques are not adequate to reduce the risk of pressure ulcer development or progression.

Box 12-19 Laboratory Studies Associated with Poor Nutrition

Serum albumin	<3.5 g/dl
Serum transferrin	<200
Prealbumin	<11 mg/dl
Cholesterol	<160
Lymphocytopenia	<1,500 (<100 indicates severe malnutrition)

Source: Adapted from *Best Practices for Care of Older Adults* (Clark & Baldwin, 2004).

Box 12-20 Snacks for Pressure Ulcer Prevention and Management

Protein sources (promote cell production and growth and tissue healing):
- Peanut butter (also a source of zinc)
- High-protein shakes
- Yogurt
- Egg custard

Zinc sources (promote cell production and tissue healing):
- Whole milk
- Cheese
- Cocoa
- Wheat bread
- Cereal

Arginine sources (for the formation of collagen and elastin):
- Walnuts
- Peanuts

Vitamin C sources (for the formation of strong blood vessels):
- Oranges
- Strawberries
- Cantaloupe

Vitamin A sources (promote tissue healing and resistance to infections):
- Carrots
- Apricots
- Pink grapefruit

Vitamin B sources (required for protein synthesis):
- Egg Salad
- Chicken

Box 12-21 Guidelines for Pressure Ulcer Treatments

1. Cleanse the wound with a noncytotoxic cleanser (saline) during each dressing change.
2. If necrotic tissue or slough is present, consider the use of high-pressure irrigation.
3. Debride necrotic tissue.
4. Do not debride dry, black eschar on heels.
5. Perform wound care using topical dressings determined by wound and availability.
6. Choose dressings that provide a moist wound environment, keep the skin surrounding the ulcer dry, control exudates, and eliminate dead space.
7. Reassess the wound with each dressing change to determine whether treatment plan modifications are needed.
8. Identify and manage wound infections.
9. Clients with Stage III and IV ulcers that do not respond to conservative therapy may require surgical intervention.

Source: Adapted from National Guidelines Clearing House Guideline for Prevention and Management of Pressure Ulcers (http://www.guideline.gov).

Box 12-22

Cytotoxic cleansers that should *not* be used for pressure ulcer management include betadine, peroxide, sodium hypochorite (Dakin's), iodophor, and acetic acid.

It is important to measure and document the healing of ulcers that are being treated by nursing and medical interventions. The **Pressure Ulcer Scale for Healing (PUSH)** tool (see **Table 12-18**) provides a consistent method of recording the effectiveness of treatment. The scale has three subscales with a possible score of 17. The score will trend downward when treatment is effective, and a score of 0 indicates complete healing of the pressure ulcer.

Prevention of pressure ulcers is dependent upon nursing assessment and early intervention. The cost of ulcers, both in medical expense and human suffering, is astronomical and is best prevented through aggressive pressure relief methods and nutritional support.

Dysphagia

Prevalence

Dysphagia, or problems with swallowing, is "an underrecognized, poorly diagnosed and poorly managed health problem" that negatively impacts the quality and potentially quantity of life (Ekberg, Hamby, Woisard, Wuttge-Hanning, & Ortega, 2004, p. 143). Although dysphagia may occur at any age, it is more prevalent in the elderly. Prevalence data suggest that 7%–10 % of persons 50 years and older living in the community (Lindgren & Janzon, 1991), up to 25% of hospitalized patients, and approximately 30%–40% of persons in nursing homes experience dysphagia (Brin & Younger, 1988; Layne, Losinski, Zenner, & Ament, 1989). It is estimated that by 2010, 16.5 million persons will require care for dysphagia (U.S. Census Bureau, 2000).

Table 12-18 PUSH (Pressure Ulcer Scale for Healing)

Length x Width	**0** 0 cm^2	**1** <0.3 cm^2	**2** 0.3–0.6 cm^2	**3** 0.7–1.0 cm^2	**4** 1.1–2.0 cm^2	**5** 2.1–3.0 cm^2	**Sub-score**
		6 3.1–4.0 cm^2	**7** 4.1–8.0 cm^2	**8** 8.1–12.0 cm^2	**9** 12.1–24.0 cm^2	**10** >24.0 cm^2	
Exudate Amount	0 None	1 Light	2 Moderate	3 Heavy			**Sub-score**
Tissue Type	0 Closed	1 Epithelial tissue	2 Granulation tissue	3 Slough	4 Necrotic tissue		**Sub-score**

Length x Width: Measure the greatest length (head to toe) and the greatest width (side to side) using a centimeter ruler. Multiply these two measurements (length x width) to obtain an estimate of surface area in square centimeters (cm^2). Caveat: Do not guess! Always use a centimeter ruler, and always use the same method each time the ulcer is measured.
Exudate Amount: Estimate the amount of exudate (drainage) present after removal of the dressing and before applying any topical agent to the ulcer. Estimate the exudate (drainage) as none, light, moderate, or heavy.
Tissue Type: This refers to the types of tissue that are present in the wound (ulcer) bed. Score as a 4 if there is any necrotic tissue present. Score as a 3 if there is any amount of slough present and necrotic tissue is absent. Scoe as a 2 if the wound is clean and contains granulation tissue. A superficial wound that is reepithelializing is scored as a 1. When the wound is closed, score as a 0.
4—**Necrotic tissue (eschar):** Black, brown, or tan tissue that adheres firmly to the wound bed or ulcer edges and may be either firmer or softer than surrounding skin.
3—**Slough:** Yellow or white tissue that adheres to the ulcer bed in strings or thick clumps, or is mucinous.
2—**Granulation tissue:** Pink or beefy red tissue with a shiny, moist, granular appearance.
1—**Epithelial tissue:** For superficial ulcers, new pink or shiny tissue (skin) that grows in from the edges or as islands on the ulcer surface.
0—**Closed/resurfaced:** The wound is completely covered with epithelium (new skin).

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Implications/Prelevance of Dysphagia

The physiological sequelae of dysphagia have traditionally received the greatest attention. Untreated dysphagia places a person at greater risk for nutritional and respiratory problems. Dehydration and malnutrition from inadequate intake predisposes persons to the development of many medical problems. Dehydration thick-

ens secretions, increasing the risk for respiratory problems, and aspiration may lead to pneumonia and death. The ability and motivation to be active and involved in daily activities may also be adversely impacted. The development of these complications is dependent on the nature and severity of the dysphagia and overall health status of the individual.

The social and psychological consequences of dysphagia must also be considered in the treatment and evaluation of care. The effects of dysphagia on quality of life were evaluated in 360 adults with subjective dysphagia complaints living in nursing homes or clinics in four European countries (Ekberg et al., 2004). The findings confirm the serious physiological impact of dysphagia. Fifty-five percent reported their eating habits were affected by their swallowing problems; over 50% ate less, with 44% experiencing weight loss; and one third were still hungry or thirsty after a meal. From a psychosocial perspective, 45% no longer found eating to be enjoyable. More than one half indicated dysphagia made life less enjoyable. Loss of self-esteem and an increasing sense of isolation also were reported. Over one third (36%) avoided eating with others, and 41% experienced anxiety or panic during meals. Of the individuals interviewed, 40% had a confirmed diagnosis, only 32% had received treatment, and just 39% believed dysphagia could be treated (Ekberg et al., 2004). An individual's ability to be nourished physically, emotionally, and socially is threatened by dysphagia.

Warning Signs/Risk Factors for Dysphagia

Deglutition is the act of swallowing in which a food or liquid bolus is transported from the mouth through the pharynx and esophagus into the stomach. Swallowing is a complex neuromuscular process that occurs in stages. Dysphagia is usually identified as oropharyngeal or esophageal, designating the phase in which dysfunction occurs. In the oropharyngeal phase, food is prepared for swallowing by mastication and mixing with saliva, and then is moved posteriorly, triggering the pharyngeal swallow reflex, which moves the bolus down the pharynx (Logeman, 1998). During the pharyngeal swallow, the larynx closes and the epiglottis redirects the bolus around the airway, protecting the respiratory tract (Logeman). The esophageal phase begins when the bolus enters the esophagus at the cricopharyngeal juncture or upper esophageal sphincter (UES). Peristaltic waves propel the bolus through the esophagus to the lower esophageal sphincter, which opens into the stomach (Logeman). Because swallowing is a complex, coordinated event, causes of dysphagia are multiple and diverse. Each type of dysphagia is characterized by specific symptoms and associated with specific disorders.

Oropharyngeal dysphagia is usually related to neuromuscular impairments affecting the tongue, pharynx, and upper esophageal sphincter (Kennedy-Malone, Fletcher, & Plank, 2004). Stroke is the leading cause of oropharyngeal dysfunction (AHCPR, 1999). Persons experiencing oropharyngeal dysphagia often complain of difficulty initiating a swallow. A cough early in the swallow and nasal regurgitation are symptoms associated with oropharyngeal dysphagia (Kennedy-Malone et al., 2004). Dysphonia and dysarthria indicate motor dysfunction in the structures involved in the oral and pharyngeal phases and may be accompanied by dysphagia (Glenn-Molali, 2002). Inadequate saliva production can also interfere with the formation and

movement of the food bolus. Candidiasis, or thrush, a fungal infection identified by white plaques on the mucous membranes of the oral cavity, can cause pain and discomfort swallowing.

Esophageal dysphagia results from motility problems, neuromuscular problems, or obstruction that interferes with the movement of the food bolus through the esophagus into the stomach (Logeman, 1998). Common symptoms of esophageal dysphagia include complaints of food sticking after a swallow and coughing late in the swallow (Kennedy-Malone et al., 2004). Muscular dystrophy, myasthenia gravis, scleroderma, achalasia, and esophageal spasms may cause motility problems. Inflammation of the esophagus, secondary to GERD or a retained pill, is another etiology for esophageal dysphagia. Medications associated with pill-induced irritation or injury include tetracycline, potassium chloride, quinidine, iron, nonsteroidal anti-inflammatory drugs, alendronate sodium, and vitamin C (Amella, 1996). Common medical conditions associated with dysphagia are outlined in Table 12-19.

Assessment

Clinical evaluation of swallowing skills in patients with conditions that predispose to dysphagia or who voice complaints that suggest a swallowing disorder should be a priority for nursing. Evaluation, as it relates to dysphagia, can refer to screening or diagnostic testing. Screening involves determining if the patient has signs or symptoms of dysphagia for the purpose of referring for diagnostic evaluation to identify physiological components of swallowing (Smith & Connolly, 2003). Nursing plays a pivotal role in the early detection of swallowing problems and intervening to prevent complications from dysphagia. The findings from a screening evaluation allow prompt referral for diagnostic workup and implementation of interventions to promote safe eating/feeding practices.

Castell (1996) suggests that 80% of dysphagia can be diagnosed through a history. The patient or caregiver should be asked about the presence of predisposing conditions or warning signs and symptoms. Key questions include: What type

Table 12-19 COMMON MEDICAL CONDITIONS ASSOCIATED WITH DYSPHAGIA

Classification of Dysphagia	Neuromuscular Causes	Mechanical Causes
Oropharyngeal dysphagia	Cerebrovascular accident Parkinson's disease Multiple sclerosis Zenker's diverticulum	Tumors Inflammatory masses
Esophageal dysphagia	Parkinson's disease Achalasia Scleroderma	Tumors Strictures Foreign bodies Medication irritation Gastroesophageal reflux disease (GERD)

of food causes the symptoms? Is the swallowing problem intermittent or progressive? Is heartburn present?

The physical examination involves a cognitive, neuromuscular, and respiratory assessment. Important cognitive factors include interest in eating, ability to focus on and complete a meal, and the ability to remember and follow directions for safe eating. Neurological assessment involves testing sensory and motor components of the cranial nerves, in particular cranial nerves V, VII, IX, X, XI, and XII. Breath sounds, the strength of the person's cough, and his or her ability to clear the throat are clues to the integrity of the respiratory structures and the presence of protective mechanisms. Although commonly considered to be protective, the gag reflex is not an indication of the patient's ability to swallow (Logeman, 1998). However, detection of laryngeal elevation during a swallow maneuver grossly suggests airway closure (Amella, 1996). Medications should be reviewed for those that can decrease saliva production (antihistamines, anticholinergics, antihypertensives, cold medications), decrease cognition (sedatives, hypnotics), and/or decrease the strength of the muscles involved in swallowing (antispasticity drugs).

A standard procedure for bedside evaluation has not been formulated (Smith & Connolly, 2003); however, screening protocols have been developed and evaluated. Screening generally involves a checklist for warning signs and symptoms (Logeman, 1998). See **Table 12-20** for warning signs of dysphagia.

The effectiveness of trained nurses to screen for dysphagia after stroke was evaluated in the Collaborative Dysphagia Audit Study (CODA). Nurses on a stroke unit received training in a simple water screening test and screened acute stroke patients. The findings demonstrated a decrease in the number of patients who kept nothing by mouth (NPO), a decrease in the number of patients with inappropriate feeding orders, and improved referrals (Stroke Research Unit; Davies, 2002). The Gatehead Dysphagia Management Model (GDMM), developed from the results of the CODA, provides a decision tree to guide assessment and management of dysphagia.

A careful assessment of the individual eating a meal also is an essential component of an evaluation, even if the initial screening does not suggest a swallowing problem (CODA, Davies, 2002). Observations that a prolonged time is required to complete a meal, "picking" at food, and active attempts to avoid eating (pushing the food away, turning away from offered food, refusing to open the mouth) may indicate a swallowing problem. Environmental factors that influence intake and eating behaviors, such

Table 12-20 Signs of Swallowing Difficulties or Dysphagia

Inability to recognize foods
Difficulty placing food in the mouth
Inability to control food or saliva
Coughing before, during, or after a swallow
Frequent coughing toward the end of or immediately following a meal
Recurrent pneumonia
Wet, gurgly voice
Weight loss without explanation*
Complaints of swallowing problems

** Note: Weight gain may occur if a large quantity of high calorie beverages such as milkshakes are consumed.*
Source: Information taken from Logeman (1998).

as distractibility, fatigue, or even compatibility with dining companions or assistants, will not be apparent in a bedside evaluation. Amella (1998) emphasizes the importance of contextual issues in an evaluation, pointing out that fatigue, pain, and anxiety may mask an older person's true abilities.

Assessment for aspiration is also important. Aspiration occurs when material passes into the larynx below the true vocal cords; silent aspiration refers to situations in which aspiration does not produce the typical cough or change in voice quality (Smith & Connolly, 2003). Pulse oximetry has been found to be an effective, efficient tool to detect aspiration while eating. In a review of trends in the evaluation and treatment of dysphagia after stroke, Smith and Connolly (2003) report that a ≥2% drop in oxygen saturation levels from baseline detects 86% of penetration/aspiration. When followed by a 10 ml water swallow test at the bedside, the ability to detect aspiration increases to 95%.

Persons at risk should be assessed upon admission to a facility or community caseload; if deterioration occurs after admission, the individual should be reassessed at that time. Persons with degenerative conditions should be reassessed on a regular basis and when the condition progresses. (Monitoring lung sounds, respiration rate and quality, and other vital signs remains an important component of ongoing assessment and evaluation of care.) If screening suggests dysphagia, a referral for diagnostic evaluation should be ordered. A more focused examination may be conducted by a speech-language therapist (SLT). Occupational therapists (OT) also may be prepared to complete an extensive examination. Further testing to confirm the diagnosis and determine the presence of and conditions surrounding aspiration are conducted by radiology or gastroenterology subspecialists. Special studies that may be indicated are described in **Table 12-21**.

Interventions/Strategies for Care

Nursing interventions to manage dysphagia in order to minimize the risk of aspiration and promote nutrition and hydration involve compensatory eating techniques, diet modification, and oral care, and may require adaptive equipment.

Compensatory Eating Techniques

Specific interventions are developed for persons with dysphagia based on the swallowing problems identified. The results of a diagnostic workup or referral to an SLT or OT should provide specific recommendations for eating techniques. However, appropriate positioning is critical for safe eating and swallowing for all individuals. An upright position with the arms and feet supported, the head midline in a neutral position, and the chin slightly tucked is recommended to minimize the possibility of aspiration. The upright position should be maintained for at least 30 to 60 minutes after eating (the longer interval is necessary for esophageal dysphagia) (Avery-Smith, 1992). The location of food placement in the mouth as well as the size, consistency, and temperature of food items are important sensory cues to promote safe swallowing. If the individual has a sensory loss or oral muscular weakness, placing food on the unaffected or least affected side may help improve control over the bolus and its movement to the back of the mouth. If movement of the food to the back of the mouth is the problem, then placement of the bolus at the back of the tongue may be necessary to trigger the swallow (Martin-Harris & Cherney, 1996). The bolus size also influences swallow. A small

Table 12-21 Adjunct Studies to Evaluate Patients with Dysphagia

Barium Swallow Studies
Suspected obstructive lesion (e.g., Schatzki's ring, tumor)
Suspected esophageal motility disorder
Double-Contrast Upper Gastrointestinal Evaluation
Suspected esophageal mucosal injury
Evaluation of oropharyngeal anatomy and function (fluoroscopy)
Suspected gastroesophageal reflux disease
Gastroesophageal Endoscopy
Suspected acute obstructive lesion (impacted food bolus)
Evaluation of the esophageal mucosa
Confirmation of a positive barium study with biopsies or cytology
Manometry
Abnormality not identified on barium study or by endoscopy
pH monitoring
Suspected gastroesophageal reflux disease
Videoradiography
Suspected risk of aspiration

Source: Spieker, M. R. (2002). Evaluating dysphagia. *American Family Physician, 61*(2).

bolus will not enter the pharynx as quickly as a large bolus, decreasing the risk of aspiration. However, a large bolus improves movement through the oral cavity in persons with delayed oral transit and also prolongs laryngeal elevation and closure (Martin-Harris & Cherney, 1996). For persons with decreased oral sensation or the impaired oral movement of food, cold items may improve posterior tongue movements and laryngeal swallow; for other persons a warm bolus facilitates swallowing (Glenn-Molali, 2002). Careful questioning and observation of the conditions that result in optimal intake without evidence of swallowing problems and those associated with apparent problems will help guide eating techniques and feeding strategies.

Characteristics of the environment, including assistive personnel and dining partners, are factors that can facilitate or interfere with a safe, efficient swallow and adequate intake. For the first meal or eating/feeding session (and subsequent meals in some cases) a quiet room is preferable to decrease distractions and allow greater concentration on eating. The health care provider should sit down to assist with eating, positioning herself or himself and the food tray directly across for the patient in order to maintain the proper posture for the patient, and assure that she or he can see and reach food items and utensils (Avery-Smith, 1992). An unhurried, calm demeanor is important. Conversation should be limited to after a swallow is completed and before the next bite is taken. However, interaction that requires a response from the person eating is necessary to provide information about changes in voice quality as well as to promote a more pleasant social experience.

Diet Modifications

Modifying the texture of the food and fluids consumed is a common response to suspected swallowing problems. Alterations in diet consistency should be tailored to the type of swallowing disorder. An example of levels for food consistency is provided in **Table 12-22**. Foods can be prepared in blenders or food processors to the approved consistency or purchased in the infant-child food section. Attention to seasoning may improve flavor and therefore adherence to and intake of a modified diet.

Thickened fluids frequently present a challenge to adequate hydration. Complaints about the texture, taste, and ability to quench thirst are common. The Dysphagia Diet Task Force has standardized food and fluid textures (see Table 12-22). Certain fluids have a thicker consistency naturally, whereas others will require thickening to the appropriate consistency with commercial or natural thickeners. Instant potato flakes, instant baby rice cereal, and mashed bananas are natural thickeners, but may not meet special diet requirements and may change the taste of the thickened items. Commercial thickening agents differ with respect to the directions for preparation and the effect of time on consistency. The type and temperature of the fluid to be thickened also affect mixing directions, so it is important to be familiar with the product used by the facility or individual at home.

Encouraging fluid intake with thickened liquids often requires creativity and persistence. Some facilities allow dysphagia patients to drink plain water between meals while requiring thickened liquids with meals. There are contradictory beliefs about the likelihood that allowing plain water will lead to aspiration pneumonia (Garon,

Table 12-22 The National Dysphagia Diet (NDD)

The National Dysphagia Diet (NDD) provides guidelines for progressive diets to be used nationally in the treatment of dysphagia. The following are some examples:

- **Dysphagia Pureed (NDD 1):** "Pudding-like" consistencies; pureed, no chunks or small pieces; avoid scrambled eggs, cereals with lumps.
- **Dysphagia Mechanically Altered (NDD 2):** Moist, soft-foods; easily formed into a bolus; ground meats; soft, tender vegetables; soft fruit; slightly moistened dry cereal with little texture. No bread or foods such as peas and corn.
  Avoid skins and seeds.
  Mechanical Soft: Same as the mechanically altered, but allows bread, cakes, and rice.
- **Dysphagia Advanced (NDD 3):** Regular textured foods except those that are very hard, sticky, or crunchy. Avoid hard fruit and vegetables, corn, skins, nuts, and seeds.
  LIQUID CONSISTENCIES:
  Spoon thick
  Honey-like
  Nectar-like
  Thin: All beverages such as water, ice, milk, milkshakes, juices, coffee, tea, sodas.

Source: Adapted from *Journal of the American Dietetic Association, 103*(3), McCallum S. L. © 2003 American Dietetic Association. Elsevier.

Engle, & Ormison, 1997; Panther, 2005). Oral care appears to be a crucial link in the aspiration to pneumonia process (Langmore et al., 1998). Frequent oral care to ensure the oral cavity is clear of food particles and prevent the growth of bacteria is a critical component of liberalized fluid programs, and an essential strategy to minimize the risk for pneumonia.

Oral Hygiene

Examination of the relative risk of multiple factors (medical/health status, functional status, dysphagia/gastroesophageal reflux, feeding/mode of nutritional intake, and oral/dental status) in the development of pneumonia in older persons suggests that colonization and host resistance are key contributors (Langmore et al., 1998). Oropharyngeal colonization from inadequate oral care, decayed teeth, or periodontal disease is the initial process that can lead to the development of pneumonia. Aspiration of these organisms in liquids, food, or saliva combined with decreased immunity increases the risk for development of pneumonia.

Regular cleaning of the teeth or dentures, gums, and tongue and maintaining moisture in the mouth are essential components of an oral hygiene protocol (see Johnson and Chalmers [2002]) for tools and strategies to address various problems providing oral care). A soft toothbrush, gauze-covered swabs, or foam toothettes may be used to scrub the surfaces of the oral cavity after meals. Electric toothbrushes may also be useful tools and, depending on the person's physical and cognitive abilities, may enable the older person with limited hand grasp and movement to more adequately and independently clean the mouth's surfaces. Individuals who receive non-oral feedings also need to have regular oral care to remove debris. The teeth and mouth should be cleaned upon awakening, after meals (or snacks for persons with dysphagia), and before bed. Dentures should be taken out and scrubbed at least daily with a brush; chemical denture cleaner tablets may be used *in addition* to brushing with soap or toothpaste (Johnson & Chalmers, 2002). Soaking dentures in a solution of white wine vinegar and cold water (a 50:50 solution) will help remove built-up calculus. Denture cups must also be cleaned or replaced regularly. A weekly cleaning and soaking of the denture cup in a diluted hypochlorite solution for an hour followed by thorough washing with soap and water will help sterilize the container (Johnson & Chalmers, 2002) if frequent replacement is not feasible.

Maintaining moist mucous membranes is essential to the health and integrity of the oral cavity. Dry membranes contribute to an increased rate of plaque accumulation (Almstahl & Wikstrom, 1999), and dental and denture plaque serve as a major reservoir for pathogenic organisms in the elderly (Aizen et al., 2004). Many of the medications prescribed for chronic conditions result in a dry mouth. Limited fluid intake and infrequent oral care, especially for persons who are ordered nothing by mouth, contribute to dryness. Meticulous oral care as outlined previously is crucial; however, additional measures may be needed. Saliva substitutes, toothpaste and mouth rinses without alcohol or excessive additives such as in the Biotene range, water or mouthwash in spray bottles to spritz inside the mouth, applying water-soluble lubricants to the tongue and cheeks, and Vaseline or lanolin applied frequently to the lips are among the strategies recommended for combating dry mouth in the physically dependent or cognitively impaired older adult (Johnson & Chalmers, 2002).

Box 12-23

Providing adequate fluid before and after administering medications will help maintain moisture and decrease the likelihood of impaired transport and esophageal irritation.

Adaptive equipment

The modification of utensils or use of adaptive equipment is frequently necessary to promote independence in eating and to facilitate safe swallowing. However, careful evaluation of eating is needed for each person to ensure safe and effective tools are used. Using a straw to drink moves a fluid bolus quickly through the mouth and can exacerbate problems with swallowing. Drinking from a cup requires the head to be tilted to empty the glass; this maneuver (hyperextension) can increase the risk of aspiration. Specially designed cups with a cutout for the nose can be purchased or made to prevent the need to tilt the head back. Similarly, shallow bowls on spoons may be helpful in preventing hypertension when eating with a spoon (Glenn-Molali, 2002). An ongoing assessment of abilities and problems at meal time will help assure necessary changes to the plan of care are made in a timely manner. Rehabilitation nurses, and texts and continuing education programs focusing on swallowing evaluation and feeding techniques are resources for new tools and techniques. Physical, occupational, and speech-language therapists can recommend specific techniques and equipment for safe intake and can help modify available tools. Their expertise and assistance should be sought.

Non-oral Feedings

The initiation of tube feedings is a complicated decision made by the patient, health care provider, and family or health care surrogate. Often prescribed to maintain adequate nutrition and hydration levels and prevent aspiration, persons receiving non-oral feedings are still at risk for aspiration (Logeman, 1998) and inadequate nutritional intake. Attention to positioning during and after a feeding and meticulous oral hygiene are very important in preventing or minimizing the risk for aspiration in persons receiving enteral nutrition. In a literature review on GI motility, feeding tube site, and aspiration, Metheny, Schallom, and Edward (2004) reported that the "aspiration risk exists to some extent in all tube-fed patients, depending on GI dysmotility patterns and individual patient characteristics. However, regardless of the feeding site, it is ultimately regurgitated gastric contents that are aspirated into the lungs. For this reason, the assessment of greatest interest for tube-fed patients is the evaluation of gastric emptying" (p. 131). Although the need for additional research is indicated, Edwards and Metheny (2000) suggest McClave et al.'s (1999) recommendation that a residual volume (RV) greater than or equal to 200 cc for nasogastric tubes and greater than or equal to 100 cc for gastrostomy tubes should raise concern about intolerance.

Box 12-24

Monitor abdominal distention by measuring the abdominal circumference from iliac crest to ileac crest. An increase in measurement of 8–10 cm beyond baseline is considered distention.

Although these volumes were associated with dysmotility, McClave et al. emphasize the importance of giving consideration to other symptoms of intolerance before holding feedings. Interruptions and incomplete feedings interfere with the nutritional adequacy of nonoral diets. Nausea/vomiting, absent bowel sounds, abdominal distention, and stool pattern are clues to intolerance that should be evaluated and factored into the decision.

Managing GERD

The relationship between gastroesophageal reflux (GERD) and enteral nutrition remains unclear; however, interventions to prevent the development of reflux or esophageal irritation and treat GERD are supported by data implicating reflux in the development of aspiration. An individual's diet pattern, in particular food or fluids associated with heartburn or discomfort, should be evaluated. Coffee, spicy foods, fatty foods, citrus fruits, alcohol, and smoking may weaken the lower esophageal sphincter and contribute to the development of the symptoms of reflux (Kennedy-Malone et al., 2004). Diet modification can be a simple, effective strategy. Sitting up for at least an hour after eating and/or raising the head of the bed 4 to 6 inches with blocks may help control the onset of symptoms, too. An oral protein pump inhibitor taken 60 minutes before a meal may be indicated (Kennedy-Malone et al., 2004). Be sure an adequate amount of fluid is consumed before and after oral medications are administered to avoid esophageal irritation.

Conclusion

The prevention and early recognition and management of common health problems in the elderly require knowledge of the person and his or her lifestyle, an understanding of risk factors and warning signs of health problems, an awareness of options for treatment, and the ability to work *with* the older person and/or caregiver to establish goals and implement a plan of care. Intellectual, technical, and interpersonal skills must be interwoven to support and maintain health. "Nurses weave a tapestry of care, knowledge, relationship, and trust that is critical to a patient's survival" (Gordon, 1997, p. 12). This tapestry is also essential to maintaining the dignity, unique identity, and quality of life in the elderly by preventing the development of conditions that limit function and fulfillment.

Box 12-25 Research Highlight

Aim: This study evaluated the relationship between urge urinary incontinence and the risk of falls and fractures in older women.

Methods: Community-dwelling women aged 65 years and older, participating in the Study of Osteoporotic Fractures (SOF), were recruited. Of 7,847 subjects in the SOF, 6,049 met criteria and completed data collection. Participants completed a self-administered questionnaire on demographic data, personal habits, medical conditions, and medications. Cognitive and functional examinations were conducted. The women were asked to call the study staff as soon as possible if a fracture occurred. Every 4 months participants were sent a postcard to return reporting any falls or fractures. Radiographic verifications of fractures were obtained.

Findings: The sample was composed of white women with an average age of 78.5 years; the majority (80%) was considered in good health and only 5% had poor cognitive function. Fifty-five percent reported at least one fall over a mean follow-up period of 3.0 years (range 90 days to 4.2 years). About 20% reported one fall per year with 5% reporting an average of one fall a year; 8.5% experienced a fracture. Almost half (46.6%) reported at least one episode of UI per month over the past year. One quarter of the participants ($n = 1{,}493$) had urge incontinence at least weekly, and 18.8% ($n = 1{,}137$) reported at least weekly stress incontinence. Seven hundred and eight women (11.7%) had both stress and urge incontinence. Weekly or more frequent urge incontinence was independently associated with falling (odds ratio [OR] 1.26; $P < .001$), whereas weekly or more frequent stress incontinence was not associated with falls (OR 1.06, $P = .3$). Weekly or more frequent urge incontinence was also independently associated with the risk of fractures (relative hazard [RH] 1.34; $P = .02$). Weekly or more frequent urge urinary incontinence independently increased the risk of falls 26% and the risk of fractures 34%.

Conclusion: Identification and treatment of urge urinary incontinence may be an effective intervention to decrease falls and fractures in community-dwelling women.

Source: Brown, J. S., et al. (2000). Urinary incontinence: Does it increase risk for falls and fractures? *Journal of the American Geriatrics Society, 48,* 721–725.

Box 12-26 Recommended Resources

Geronurse online (http://www.geronurseonline.org) provides free resources, including assessment instruments and specialty nursing web links.

Morse, J. (1997). *Preventing patient falls*. Thousand Oaks, CA: Sage.

National Association for Continence (NAFC). Advocate and informational resource for the public and professionals on continence, its management, and resources (http://www.nafc.org).

Simon Foundation. Advocate and educational resource for the public and professionals on urinary continence (http://www.simonfoundation.org).

Try This: Best Practices in Nursing Care to Older Adults from The Hartford Institute for Geriatric Nursing, Division of Nursing, New York University. Addresses topics such as preventing aspiration, avoiding restraint use in patients with dementia, and oral assessment. Material may be downloaded and/or distributed in electronic format (http://www.hartfordign.org).

University of Iowa Gerontological Nursing Interventions Research Center. Research-based protocols on a variety of common health problems including prompted voiding, restraint use, prevention of falls, oral care, and depression. Access the list and order form: http://www.nursing.uiowa.edu/centers/gnirc/

Critical Thinking Exercises

1. Mrs. Jones, an 80-year-old widow living alone in the community, was recently diagnosed with congestive heart failure. Concurrent health problems include osteoarthritis and osteoporosis. During the initial home health visit, the nurse notices the faint odor of urine. Upon questioning, Mrs. Jones reports she often is up several times a night to urinate. She says she has done this for years and has adjusted. Should this be considered a problem? What additional information is needed for decision making? What evidence can the nurse provide to Mrs. Jones to support a need for further evaluation and treatment of this problem?
2. Your grandfather has been admitted to the hospital with pneumonia. He lives independently and is cognitively alert. When you go to the hospital to stay with him, you find him confused and disoriented. He is in bilateral arm restraints. Upon questioning the nursing staff about the restraints, they report that he has been trying to pull his IV out and gets out of bed without calling for assistance. His nurse states that they do not have time to stay with him. What interventions would you discuss implementing with his nursing staff?
3. A 60-year-old African American female has been admitted to the rehabilitation hospital for exacerbation of rheumatoid arthritis. Her past medical history includes congestive heart failure, Type 2 diabetes mellitus, and hypertension. While obtaining her history, you note

that she was diagnosed with obstructive sleep apnea a year ago and has been using a CPAP appliance for the past 11 months. She states that she "sleeps much better" since beginning the CPAP, but still takes a couple of hours to fall asleep at night. She drinks a small glass of brandy each night at around 10:00 p.m. and listens to the television while trying to fall asleep. She goes to bed at 11:00 p.m., but gets up at different times each morning. Why is she at risk for sleep problems? How would you assess the effect of her delayed sleep onset? What nursing interventions may help improve her sleep habits?

Personal Reflection

1. The nursing staff in a long-term care facility insist that checking residents every 3 hours for incontinence and changing undergarments when needed is more cost-effective and labor-saving than bladder training. They point out that no one has developed skin breakdown. Develop a plan to promote continence and a rationale to support implementation. Consider your philosophy of nursing and conception of care for elderly in the rationale.
2. You have been involved in a motor vehicle accident and wake up in the ICU with both arms restrained. Discuss the emotions you would experience. What would you want the nursing staff to say or do?
3. Wear a protective undergarment for 24 hours and follow a 2-hour toileting schedule during the day. How do the experiences influence your activity and your mood?
4. Have someone feed you an entire meal. What was your interaction like (who talked, what were the topics of conversation)? How did it feel to be fed? Did your pattern for eating or amount of food and fluid consumed, differ?

Glossary

Adverse drug reaction (ADR): A detrimental response to a given medication that is undesired, unintended, or unexpected in recommended doses

Bladder diary: A daily record of the time and volume of fluid intake, voiding, and incontinence episodes with associated activities

Bladder training: An intervention that focuses on providing patients with the tools to delay urination and suppress urgency in order to establish more normal voiding intervals

Braden Scale for Pressure Ulcer Risk Assessment: An instrument that determines the risk of pressure ulcer development

Chemical restraint: The use of a psychopharmacological drug for the purpose of discipline or convenience, and that is not required to treat medical symptoms

Deglutition: The act of swallowing in which a food or liquid bolus is transported from the mouth through the pharynx and esophagus into the stomach

Delirium: Manifests as a disturbance in consciousness, cognitive, or perceptual change that develops over time, fluctuates during the course of the day, and is a physiological consequence of a medical condition or medication

Dementia: A group of symptoms, accompanying disease, that manifests as memory loss, disorientation, changes in mood or personality, and difficulties in abstract thinking, task performance, and language use

Dependent continence: Requires the assistance (physical help, cues, or supervision) of another person to maintain continence

Depression: A disorder that includes changes in feelings or mood, described as feeling sad, hopeless, pessimistic, or "blue," lasting most of the day, with loss of interest in pleasurable activities

Drug–drug interaction: An interaction that occurs when two or more drugs are taken concurrently

Dysphagia: Problems with swallowing

Established incontinence: Incontinence that persists beyond resolution of acute causes or is longstanding

Extrinsic risk factors for falls: Environmental hazards and challenges that cause or contribute to falls

Fall: An event that results in a person unintentionally coming to rest on the ground or lower surface

Functional urinary incontinence: Incontinence that results from factors external to the lower urinary tract such as cognitive impairments, physical disabilities, and environmental barriers

Generalized anxiety disorder (GAD): Characterized by persistent, excessive worry with fluctuating severity of symptoms that include restlessness, irritability, sleep disturbance, fatigue, and impaired concentration

Independent continence: Continence or control that is based on the competence of the individual and does not require the assistance of others

Insomnia: Difficulty falling asleep or staying asleep

Intrinsic risk factors for falls: Changes associated with aging and with physical functioning needed to maintain balance

Medication error: Taking the wrong medicine, or the wrong dose at the wrong time or for the wrong purpose

Mixed urinary incontinence: The existence of urge and stress urinary incontinence symptoms at the same time

Nocturia: The awakening from sleep to urinate more than once during the night

Nonadherance: A person's unwillingness to follow the instructions given for a medication or treatment

Nonrapid eye movement (NREM) sleep: Part of the sleep cycle with non-rapid eye movement

Overflow urinary incontinence: Urine leakage that occurs when the bladder is overdistended

Panic disorder: Characterized by an autonomic arousal that includes tachycardia, difficulties breathing, diaphoresis, light-headedness, trembling, and severe weakness

Partial continence: Situations in which a caregiver's assistance is sometimes needed to maintain continence, but is not required all the time

Pelvic muscle rehabilitation: An exercise program designed to increase the strength, tone, and control of the pelvic floor muscles to facilitate a person's ability to voluntarily control the flow of urine and suppress urgency

Pharmacodynamics: The biochemical or physiological interactions of drugs or "what the drugs do to the body"

Pharmacokinetics: The absorption, distribution, metabolism, and excretion of a drug or "what the body does to the drug"

Physical restraint: Any physical or mechanical device that involuntarily restrains a patient as a means of controlling physical activity

Polypharmacy: The act of taking many medications concurrently

Pressure ulcer: A lesion caused by unrelieved pressure with damage to the underlying tissue.

Pressure Ulcer Scale for Healing (PUSH): A tool that provides a consistent method of recording the healing of a pressure ulcer or the effectiveness of treatment

Prompted voiding (PV): A scheduled intervention aimed at helping the individual recognize and act effectively on the sensation of the need to void

Rapid eye movement (REM) sleep: Part of the sleep cycle, characterized by rapid eye movements

Recurrent falls: More than two falls in a 6-month period

Restless leg syndrome: A disorder in which a person experiences periodic leg movements during sleep

Sleep apnea: A sleep disorder characterized by cessation of breathing

Social continence: Situations in which continence cannot be achieved, but urine leakage is contained to maintain dignity and comfort

Stress urinary incontinence: The involuntary loss of urine during activities that increase intra-abdominal pressure, such as lifting, coughing, or sneezing

Transient incontinence: Incontinence caused by the onset of an acute problem that once successfully treated will result in resolution of the UI

Urge suppression techniques: Strategies that help control bladder contractions and therefore minimize or resolve urgency

Urge urinary incontinence: Associated with a strong, abrupt desire to void and the inability to inhibit leakage before reaching the toilet

Urinary incontinence (UI): The involuntary leakage of urine

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Section 6

Information and Health Care Technologies (Competencies 16, 17)

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Chapter 13

Using Assistive Technology to Promote Quality of Life for Older Adults

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LEARNING OBJECTIVES

At the end of this chapter, the reader will be able to:

1. Identify assistive technology and methods for teaching older adults about its use.
2. Recognize common applications of assistive technology to enhance older adults' functioning independence, and safety.
3. Describe Internet and Web approaches for assistive technology, including learning activities, health information, and health care services that can be used in caring for older adults and their families, along with teaching strategies for its access.
4. Discuss new assistive technologies on the horizon.

KEY TERMS

- Assistive device
- Assistive technology
- Augmentative and alternative communication (AAC)
- Emergency response system (ERS)
- Environmental controls
- Internet
- Nursing informatics
- World Wide Web

This century reflects a time of change for nursing and the way that nurses deliver health care to the population over the age of 65 years. Americans are living longer, and by the year 2030 this age cohort will increase from about 30 million in the 1990s to more than 70 million (U.S. Census Bureau, 2004). Most of these individuals expect to have an active life in the community well into their seventh decade. Each decade of life past age 65 brings with it acute illnesses and chronic conditions accompanied by increased disability (CDC, 2004). Nurses caring for older adults must advocate for and use new ways to provide care to these adults that promotes their quality of life. The purpose of this chapter is to provide information about the integration of nursing care with the latest **assistive technology** that supports the care of older adults, as well as describe the technologies on the horizon.

Introduction to Assistive Technology

This growing population of older adults will change many aspects of health care. One change will be an increase in the number of people who experience a disabling condition. As individuals age or become disabled, mental and physical changes may influence their ability to live as independently and productively as they would wish. A lessening or loss of strength, balance, visual and auditory acuity, cognitive processing, and/or memory may affect the way they are able to function at home.

Assistive technology devices are mechanical aids that substitute for or enhance the function of some physical or mental ability that is impaired (Kelker, 1997). The term *assistive technology* encompasses a broad range of devices from "low tech" (e.g., pencil grips, splints, paper stabilizers) to "high tech" (e.g., computers, voice synthesizers, Braille readers). These devices include the entire range of supportive tools and equipment, from adapted spoons to wheelchairs and computer systems for environment control.

As a tool for living, the primary purpose of assistive technology is to bridge the gap between an older person's declining capabilities and the unchanging environmental demands of home and community (Gitlin, 1998). The use of assistive devices may enable independent performance, increase safety, reduce risk of injury, improve balance and mobility, improve communication, and limit complications of an illness or disability. These devices are not just for those who are disabled or have functional limitations. Assistive devices can also help individuals who are aging and who may benefit from using them to promote safety and reduce the risk of injury, as well as individuals experiencing age-related changes or functional decline and who may benefit from equipment and devices that enable independent performance and prevent disability.

Norburn and colleagues (1995) found that a large number of older adults practice some form of self-care, even in the absence of reported disability. Their study determined the "extent to which self-care coping strategies, defined as modifying the environment, changing behavior, and/or using special equipment and devices, are employed by older adults at all levels of functioning in order to maintain a viable and independent social life without the need for institutional care" (p. S101). More than 75% of the subjects made behavioral changes in their daily routines (e.g., doing things more slowly) during the year before the survey. About 42%

of the subjects reported using assistive devices, and almost one third had modified their built environment.

Assistive Device Use

Living at home can be made easier with the use of **assistive devices**. The increased independence afforded individuals who use these devices may ultimately result in their being able to remain in their homes for longer periods of time with reduced concerns for safety. Many of these devices are inexpensive and easy to obtain, but the general population's knowledge of them is poor. Consequently, individuals who are aging or disabled may not be living their lives to their fullest potential.

There is no evidence to suggest that older adults use assistive technology and devices less than young adults, but it is not known whether there is greater reluctance among the elderly to use high-technology vs. low-technology solutions. A number of research and service programs are currently evaluating the willingness of older adults to use high technology, such as computer-based systems to increase communication, and social integration and smart house arrangements to increase safety and function (Gitlin & Schemm, 1996).

The probability of engaging in self-care practices and the type of strategy employed varies with levels of impairment. Older adults with moderate levels of impairment rely more on special equipment and assistive devices, whereas those with slight functional impairments tend to change their behavior (Norburn et al., 1995). "Of importance is the consistent finding that device use has a dual outcome: At the same time that a device promotes independence, it appears to also raise concerns about social stigma, feelings of embarrassment, and issues related to personal identity and self-definition" (Gitlin, 1998, p. 154). There is no stigma involved in the use of developmentally appropriate equipment or tools for children (e.g., jumbo crayons), so why should equipment and device use in older adults be seen as a response to disability (e.g., wide Dr. Grip pens)?

Mann, Hurren, and Tomita (1993) studied assistive device use by interviewing 157 noninstitutionalized older persons in their homes. Study participants were not selected randomly, however, but were individuals who were recently or currently receiving services from a human service agency, hospital, or nursing home. The researchers used the definition of an assistive device provided in the Technology-Related Assistance for Individuals with Disabilities Act of 1988: "Any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized that is used to increase, maintain, or improve functional capabilities of individuals with disabilities" (U.S. Congress, 1988). They found that subjects owned a mean of 13.7 devices and used 10.8 of the devices. Older persons with multiple impairments that included physical impairments used the greatest number of devices. Subjects also expressed a need for additional equipment and devices.

Another study by Mann, Hurren, and Tomita (1995) examined the need for and current use of assistive devices by home-based older adults with arthritis. Subjects were assigned to a moderate or a severe arthritis group according to the impact of arthritis on their activities. Subjects in the severe arthritis group had more chronic diseases, a higher level of pain, and a lower level of independence in self-care activities than subjects in the moderate group. Both groups reported using a high number of assistive

devices (about 10 per person), and expressed the need for additional devices, such as reachers, magnifiers, jar openers, grab bars, and hearing aids. Generally, there was a high rate of satisfaction with the equipment and devices used.

More recently, Kraskowsky and Finlayson (2001) reported usage rates from 47% to 82% of equipment and devices prescribed. Mann, Goodall, Justiss, and Tomita (2002) found that study participants owned a mean of 14.2 assistive devices, used 84.8% of the devices, and were satisfied with 84.2% of the devices they owned. Mann, Llanes, Justiss, and Tomita (2004) looked at the value older individuals themselves place on their equipment and devices by interviewing 1,016 home-based frail older adults in western New York and northern Florida, specifically asking them what they considered their "most important" assistive device and why. Although "importance" is a general construct, it embodies the perception of "usefulness" and impact on ability to do tasks and participate in activities. Not considering the number of users, the top five most important equipment and devices were eyeglasses, canes, wheelchairs, walkers, and telephones. Controlling for the number of people using the device, the top five most important devices were oxygen tanks, dentures, 3-in-1 commodes, computers, and wheelchairs.

Mann, Ottenbacher, Frass, Tomita, and Granger (1999) studied the effectiveness of assistive devices and environmental modifications in maintaining independence and reducing home care costs. One hundred four frail older adults recently referred to home health care were randomly assigned to a treatment group or a control group. Individuals in the treatment group received a functional assessment, a home assessment, and any necessary equipment and/or assistive devices and environmental interventions. The control group received usual care services. The frail older adults in the study experienced functional decline over time, but the control group declined significantly more. Costs related to hospitalization and nursing home stays were more than three times higher for the control group. This randomized control trial provided strong evidence that appropriate and necessary equipment or devices can slow the rate of functional decline and reduce health-related costs.

Based on the literature, a number of conclusions can be drawn. Although studies have shown varied results, a consistent finding is that older adults are willing to use assistive devices. Studies have also concluded that some individuals, particularly those who are less impaired, might be more likely to modify their behaviors than use equipment or devices for assistance. Unfortunately, the definition of assistive devices varies across studies as well as the characteristics of the individuals studied. For example, Mann and colleagues tend to seek older adult subjects who are impaired or at risk for needing assistive devices. Regardless of the study, however, researchers have stated that older adults are lacking adequate information about assistive technology that could improve quality of life.

Teaching About the Use of Assistive Technology

Use of assistive technology is a type of health behavior among older adults to maintain their independence and enable them to live at home. From the viewpoints of national health economy and quality of life of older adults and caregivers, it is important to understand who does not use devices and why they do not. This type of tech-

nology offers the potential of increasing independence and quality of life for older individuals, as well as reducing health-related costs.

A study by Mann, Goodall, Justiss, and Tomita (2002) sought to identify those types of equipment and devices with a higher frequency of nonuse, and the reasons given by older adults for not using them. Based on the Rehabilitation Engineering Research Center on Aging Consumer Assessments Study, 1,056 subjects reported use or nonuse of assistive devices. Of these subjects, 873 identified reasons for not using or being dissatisfied with certain equipment and devices. These were grouped into categories based on the type of impairment they addressed (hearing, vision, cognition, and musculoskeletal/neuromotor). Study participants owned the largest number of equipment and devices in the musculoskeletal/neuromotor category, such as canes. Equipment and devices in the hearing impairment category were rated lowest by participants in terms of satisfaction. Almost half of all reasons listed for not using certain assistive devices related to perceived lack of need.

The purpose of a study by Tomita, Mann, Frass, and Stanton (2004) was to identify predictors of the use of assistive devices that address physical impairments among cognitively intact, physically frail older adults living at home. Interviewers who visited their homes identified equipment and devices in use. White elders who live alone in the south, are physically disabled, take more medications, and are less depressed tend to use more equipment and devices to address physical impairments than nonwhite elders who are living with someone in the northern United States and who have less severity of physical disability, take fewer medications, and are more depressed. Among all the variables, physical disability was the most significant predictor of use. Consistent with findings from previous studies, income, education, and marital status were not associated with their use. In addition, age and gender were not significant.

Kraskowsky and Finlayson (2001) compared 14 studies of factors influencing use of assistive devices by older adults. They found that use of them decreased over time. The primary reason for nonuse was lack of fit between the person and the person's environment. They suggested a range of factors to consider when prescribing assistive technology to older adults, including personal (client) factors, the equipment and device's fit with the client's environment, and intervention-related factors. Creating a positive expectation for the use of the equipment and/or device, when it is introduced, can influence the client factor. Knowing what to expect in the client's environment when prescribing an assistive device can influence its fit within the environment. Increasing the frequency and duration of education on the assistive device can positively influence use.

A careful evaluation of older adults is an important step in determining their need for assistive devices and equipment to enhance and maintain independence and quality of life (Kraskowsky & Finlayson, 2001). The evaluation may occur during acute care, inpatient rehabilitation, home care, or outpatient visits (Roelands, Van Oost, Depoorter, & Buysse, 2002) by any interdisciplinary team member (i.e., nurse, physician, therapist, dietitian, or social worker). Typically, an occupational therapist determines whether the equipment is appropriate for older adults and their environment and educates them and their caregivers on use and care of assistive devices. However, all team members have a responsibility for evaluation and follow-up, as needed. Appropriate fit

between the person's ability, the demands of the environment, and each piece of equipment or device is essential to successful task performance.

Assistive devices and equipment are typically first introduced in the hospital, outpatient, or home care setting, primarily to enhance independence in self-care. During inpatient rehabilitation, an older adult will receive an average of eight pieces of equipment and/or devices to use in the home for mobility, dressing, seating, bathing, grooming, and feeding. Those living in the community with a functional impairment report having an average of 14 pieces of equipment and/or devices in the home, including those for hearing and vision (Gitlin & Schemm, 1996). With shortened hospital stays and briefer exposure to occupational and physical therapy, the need for efficient and effective instruction in assistive device use becomes that much more important for nurses. Teaching an elderly person to use technology should not be limited to the person alone, but should include caregivers and other family members. Education must be sensitive to any physical, cognitive, psychological, and environmental factors that affect the elderly person. When introducing technology to the elderly and teaching them to use it, there are several guidelines that can be employed (see **Box 13-1**).

Box 13-1 Guidelines for Introducing Technology, and Teaching the Elderly About Its Use

- The use of technology must be perceived as needed and meaningful, and must be linked to the lifestyle of the person.
- Cautions and disbelief in one's capability may be an obstacle in accepting new technology and must be considered when creating the learning environment.
- A generous amount of time as well as repeated short training sessions should be allowed.
- More stress should be placed on the practical application of the device than on its technical features.
- Only selective, central facts should be presented.
- Mnemonics and cues will favorably affect self-efficacy in handling new products.
- Training sessions should be held in the home or natural meeting places of the elderly.
- The instructor should be well-known by the elderly or introduced well in advance of the training.
- The attitudes of the instructors toward the aged must be positive and realistic.

Source: Idaho Assistive Technology Project. (1995). *Assistive technology and older adults.* Information Sheet #25.

Common Applications of Assistive Technology

The following are common assistive technology applications (Kelker, 1997): 1) position and mobility, 2) environmental access and control, 3) self-care, 4) sensory impairment, 5) social interaction and recreation, and 6) computer-based technology.

Position and Mobility

Older adults may need assistance with their positions for seating so that they can effectively participate in activities and interact with others. Generally, nurses or therapists try to achieve an upright, forward-facing position for the individual by using padding, structured chairs, straps, supports, or restraints to hold the body in a stable and comfortable manner (Kelker, 1997). Examples of equipment used for positioning are walkers, floor sitters, chair inserts, wheelchairs, straps, traps, and standing aids.

Conversely, older adults whose physical impairments limit their mobility may need a device to help them get around or participate in activities. Mobility devices include self-propelled walkers, manual or powered wheelchairs, and powered recreational vehicles like bikes and scooters.

Environmental Access and Control

Access to shopping centers, places of business, schools, recreation, and transportation is possible because of assistive technology modifications. This kind of assistive technology includes modifications to buildings, rooms, or other facilities that allow people with physical impairments to use ramps and door openers to enter, allow people with visual disabilities to follow Braille directions and move more freely within a facility, and allow people of short stature or people who use wheelchairs to reach pay phones or operate elevators (Kelker, 1997).

Once inside a building, various types of **environmental controls**, including remote control switches and special adaptations of on/off switches to make them accessible (e.g., Velcro attachments, pointer sticks), can promote independent use of equipment by an older adult. Robotic arms and other environmental control systems turn lights on and off, open doors, and operate appliances. X-10 is an electronic environmental control that allows individuals to control lights, heating, and cooling, as well as just about any electrical piece of equipment, such as curtains, garage doors, and gates. Basic installation is very easy for lamps and plug-in items. The minimum requirements are one control unit and one control module. No wiring is required. First, the control unit is plugged in, then the lamp to be controlled is plugged into a module, and finally the module is plugged into an outlet. There are also several types of modules and switches available to replace existing wall switches (X-10, 2005).

Self-Care

Assistive devices for self-care include such items as robotics, electric feeders, adapted utensils, specially designed toilet seats, and aids for tooth brushing, washing, dressing, and grooming. An **emergency response system (ERS)** can increase the safety of an individual who requires assistance with self-care activities. The most common ERS is the telephone-based personal emergency response system (PERS), which consists of the subscriber wearing a small help button as a necklace or wristband, with a home communicator that is connected to a residential phone line (Mihailidis & Lee, 2003). In the event of an emergency, the subscriber presses the help button and is connected to a live emergency response center, which arranges for appropriate help, such as calling paramedics or the person's family.

Remote health monitoring devices have also been developed that measure and track various physiological parameters, such as pulse, skin temperature, and blood pressure (Mihailidis & Lee, 2003). These systems are less commonly

found in the home, but are growing in demand despite their restrictions. They require the user to wear the device at all times, and/or to manually take the required measurements and enter the data into the system, which then automatically transmits to an evaluation and emergency service station.

Many of the PERS and physiological-based monitoring systems are inappropriate, obtrusive, and difficult for an older adult to operate. These systems require effort from the person, sometimes long training times in order for the person to learn how to use the required features, and they become ineffective during more serious emergency situations, such as if the person has a stroke (Mihailidis & Lee, 2003). As a result, new systems are being developed that do not require manual interaction from the user and that use nonphysiological measures to determine health parameters. Studies have shown that a decline in an older adult's ability to complete activities of daily living (ADLs) is a strong indicator of declining health and may increase the likelihood of an emergency situation occurring (Mihailidis & Lee). Several researchers are developing systems that can monitor ADLs in the home. These systems use simple switches, sensors, and transducers located at various places in the user's environment and attached to various objects to detect which tasks are being completed.

Sensory Impairment

Older adults may experience impairment in their speech, hearing, or sight. From 2 to 2.5 million Americans have communication disorders too severe to permit them to meet their daily communication needs using only natural speech and handwriting (National Institutes of Health [NIH], 2000). The term **augmentative and alternative communication (AAC)** refers to all forms of communication that enhance or supplement speech and writing, either temporarily or permanently. Augmentative and alternative communication can both enhance (augmentative) and replace (alternative) conventional forms of expression for people who cannot communicate through speech, writing, or gestures. Augmentative and alternative communication devices offer dynamic displays (i.e., electronic displays that change with user input), synthesized (computer-generated) and digitalized (recorded) speech, and are accessible through many input modalities, including touchscreen, keyboard, and infrared headpointers (Dickerson, Stone, Panchura, & Usiak, 2002).

The goal of AAC is to encourage and support the development of communicative competence so that people can participate as fully as possible in home and community environments, and to improve the efficiency and use of communication aids. Selecting the communication methods that are best for an individual is not as simple as getting a prescription for eyeglasses (American Speech-Language-Hearing Association [ASLHA], 1997). Language is complex, and individuals learn to use it every day. Indeed, developing the best communication system for a person with a severe speech and language problem requires evaluation by many specialists (ASLHA), all of whom may not have offices in the same building or even in the same city. Communication boards, using pictures as symbols for words, may need to be made. Vocabulary to meet the needs of a wide range of communication disorder situations must be selected. Equipment may need to be ordered and paid for. Health plans or other third-party payors may need to be contacted.

And once all the parts of the communication plan are in place, the user must learn to operate each part of the system effectively and effi-

ciently. Professionals (e.g., nurses, therapists) need to help the user and his or her communication partners learn a variety of skills and strategies, which might include the meaning of certain hand shapes and how to make them; starting and stopping a piece of electronic equipment at a desired word or picture; ways to get a person's attention; ways to help a communication partner understand a message; and increasing the rate of communication (ASLHA, 1997). Without effort by the user, professional help, ongoing practice, and support from friends, family, and colleagues, the promises of augmentative communication may not be realized.

Much of the time, individuals are expected to learn through listening. Hearing impairments can interfere with an older adult's speaking, reading, and ability to follow directions. Assistive devices to help with hearing and auditory processing problems include hearing aids, personal FM units, Phonic Ear, or closed caption TV.

Vision is also a major learning mode. General methods for assisting with vision problems include increasing contrast, enlarging stimuli, and making use of tactile and auditory models. Devices that assist with vision include screen readers, screen enlargers, magnifiers, large-type books, taped books, Braillers, light boxes, high contrast materials, and scanners.

Social Interaction and Recreation

Older adults still want to have fun and interact socially with others. Assistive technology can help them to participate in all sorts of recreational activities that can be interactive with friends (Kelker, 1997). Some adapted recreational activities include drawing software, computer games, computer simulations, painting with a head or mouth wand, and adapted puzzles.

Box 13-2 Resource List

Adaptive and Assistive Technology, www.rehabtool.com
Administration on Aging, www.aoa.gov
Association of Retired Persons, www.aarp.org
BrainBashers Games and Puzzles, http://brainbashers.com
CataList, the official catalog of LISTSERV lists, www.lsoft.com/lists/listref.html
ElderWeb, www.elderweb.com
Free Greeting Cards, www.123greetings.com
Healthfinder, www.healthfinder.com
Learn the Net, www.learnthenet.com
Medicare, www.medicare.gov
National Association of Area Agencies on Aging, www.n4a.org
National Library of Medicine, www.nlm.nih.gov
SeniorNet, www.seniornet.org

Computer-Based Assistive Technology

Some older adults may require special devices that provide access to computers. Controllable anatomical movements like eye blinks, head or neck movements, or mouth movements may be used to operate equipment that provides access to the computer. Once a controllable anatomical site has been determined, decisions can be made about input devices including switches, alternative keyboards, mouse, trackball, touch window, speech recognition, and head pointers (Kelker, 1997).

Computers are an important type of assistive technology because they open up so many excit-

ing possibilities for writing, speaking, finding information, or controlling an individual's environment. Software can provide the tools for written expression, calculation, reading, basic reasoning, and higher level thinking skills. The computer can also be used to access a wide variety of databases.

Many examples of the assistive devices mentioned above can be found on the ABLEDATA Web site (www.abledata.com). It is a federally funded project whose primary mission is to provide information on assistive technology, including all types of adaptive equipment and assistive devices, available from domestic and international sources to consumers, organizations, professionals, and caregivers within the United States. The ABLEDATA database contains information on more than 30,000 assistive technology products (over 20,000 of which are currently available), from white canes to voice output programs. The database contains detailed descriptions of each product including price and company information. The database also contains information on noncommercial prototypes, customized and one-of-a-kind products, and do-it-yourself designs.

The Internet and the World Wide Web

The **Internet** is not just about data; it is an international community of people who share information, interact, and communicate. From the point of view of its users, the Internet as an assistive technology is a vast collection of resources that includes people, information, and multimedia. The Internet is best characterized as the biggest labyrinth of computer networks on earth (*Free On-Line Dictionary of Computing* [*FOLDOC*], 2004). A computer network is a data communications system made up of hardware and software that transmits data from one computer to another. In part, a computer network includes a physical infrastructure of hardware like wires, cables, fiber optic lines, undersea cables, and satellites. The other part of a network is the software to keep it running. Computer networks can connect to other computer networks to get an even bigger computer net-

Box 13-3 Recommended Readings

American Nurses Association. (2001). *The scope and standards of nursing informatics practice.* Washington, DC: American Nurses Publishing.

Burdick, D. C., & Kwon, S. (Eds.). (2004). *Gerotechnology: Research and practice in technology and aging: A textbook and reference for multiple disciplines*. New York: Springer.

Charness, N., & Schaie, K. W. (Eds.). (2003). *Impact of technology on successful aging.* New York: Springer.

Hart, T. (2004). Evaluation of Websites for older adults: How "senior-friendly" are they? *Usability News, 6*(1). Retrieved November 17, 2004, from http://psychology.wichita.edu/surl/usability_news.html

Nicoll, L. (2001). *Nurses' guide to the Internet.* Philadelphia: Lippincott Williams & Wilkins.

Thede, L. (2003). *Informatics and nursing: Opportunities & challenges.* Philadelphia: Lippincott Williams & Wilkins.

work. Thus, the Internet is a set of connected computer networks. In contrast, the **World Wide Web** (WWW or Web) is not a network. The Web is not the Internet itself, nor is it a proprietary system like America Online. Instead, the Web is a system of clients (Web browsers) and servers that use the Internet to exchange data (*F0LD0C*).

The Internet and the World Wide Web are evolving into an environment for collaboration, content exchange, mentorship, and creative endeavors. This virtual environment is becoming an accessible place for the building of intellectual assets, where knowledge can be effectively identified, distributed, and shared. Nursing professionals are joining this growing evolution in a number of different ways. Many nurses work hard to shape at least some of the Internet and World Wide Web into a milieu for active participation that serves to inform, educate, and advocate for older adults. Some nurses may specialize in **nursing informatics**.

Nursing Informatics

Nursing informatics is a 21st-century science with great potential for improving the quality, safety, and efficiency of health care. About 20 years ago, Hannah proposed a simple definition for nursing informatics. She said that nursing informatics encompasses the use of information technologies in relation to any functions that are within the sphere of nursing and that are carried out by nurses in the performance of their practice (Ball & Hannah, 1988).

Graves and Corcoran (1989) presented a more complex definition of nursing informatics. They argued that "nursing informatics is a combination of computer science, information science and nursing science, designed to assist in the management and processing of nursing data, information and knowledge to support the practice of nursing and the delivery of nursing care" (p. 227). The American Nurses Association (ANA) modified the Graves and Corcoran definition when it developed the *Scope and Practice for Nursing Informatics* and distinguished between practice and theory (ANA, 1994). The ANA currently defines nursing informatics as "a specialty that integrates nursing science, computer science, and information science to manage and communicate data, information, and knowledge in nursing practice . . . to support patients, nurses, and other providers in their decision-making . . . using information structures, information processes and information technology" (2001, p. 46).

The *Scope and Standards of Nursing Informatics Practice* is a professional guideline and an essential reference for nurses (ANA, 2001). A condensed outline of nursing informatics concepts, terms, roles, and competencies written by a committee of recognized leaders in the field is presented in this booklet. These competencies cover four distinct skill levels that include the beginning nurse, experienced nurse, informatics nurse, and informatics innovator (Staggers, Gassert, & Curran, 2001). The ANA competencies include computer literacy (basic computer skills), information literacy (library science or retrieving and evaluating information), and overall informatics competencies. Although nursing informatics is a growing area of specialization, all nurses can employ basic information technology in their practice.

Using the Web

The fastest growing segment of an estimated more than 80 million navigators of the Web in the United States is older adults (U.S. Department of Commerce, 2002). Estimates of those

adults over 50 years of age on the Internet range from 16% of users to 45% (Center for Medicare Education, 2002). In the year 2000, about 60% of older adult Web users were men and about 40% were women. In February 2004, the gender ratio among these users had shifted to 50% men and 50% women (Pew Internet & American Life Project, 2004). Computer ownership has increased among older adults; 40% of these adults currently report having a personal computer at home compared to 29% in 1995. Additionally, 1 in 10 older adults without access to the Internet from home or from work say that they sometimes access the Internet from another place such as a friend's, neighbor's, or relative's home or the public library (Center for Medicare Education). These older adults spend more than 8 hours online each week, using Web-based materials or electronic documents in various formats and media.

Researchers have found that Web use by older adults enhances self-esteem and increases a sense of productivity and accomplishment (Purnell & Sullivan-Schroyer, 1997) as well as increasing their social interaction (Kautzmann, 1990; Post, 1996). Web use also meets older adults' needs for personal control (McConatha, McConatha, & Dermigny, 1994), mental stimulation, and fun (Weisman, 1983). They are passive and active participants who primarily use e-mail, send pictures, and search for health care information (*Interest Survey*, 2004). And once the baby boomer generation, most of whom are already computer-literate, becomes the Medicare generation, older adult Web use will soar. Therefore, gearing access to and design of Web sites toward this older population becomes an important task.

Web Site Design

Designers for Web sites sometimes fail to recognize older adults as a potential user group for their technology. Industry has only recently begun adapting access to hardware and designing software that make accommodations for the needs of older adults. This age group has specific abilities and performance attributes that need to be addressed that coincide with several life changes. Functional limitations related to visual, hearing, and mobility changes are common among older adults as a result of bodily changes secondary to the aging process. These changes may deter their ability to use the Web. After age 65, a large proportion of this population begins to demonstrate significant visual acuity deficits. In addition, beyond age 65, one in four older adults is affected by hearing loss and some of them may develop essential benign tremor that may impair their fine motor skills (Reuben et al., 2004). Increasing font size to at least 18 or using computer magnification screens compensates for decreased visual acuity; using the Tab key or a touch screen attached to a monitor eliminates the necessity to have fine motor skills to move the cursor; and using external speakers or headphones for increased amplification can compensate for sensory and mobility impairments.

In general, older adults are slower in using the computer (Czaja & Sharit, 1998), travel to fewer Web pages (Liao, Groff, Chaparro, Chaparro, & Stumpfhauser, 2000), and spend more time selecting targets for tasks than younger users (Chaparro, Bohan, Fernandez, Choi, & Kattel, 1999). Many groups and researchers have developed comprehensive sets of guidelines to improve Web design, and thus accessibility for older adults (e.g., Web Content Accessibility Guidelines (W3/WAI) and the government-instituted U.S. Section 508 Guidelines [GSA, 2002; W3C, 2004]). The National Institute on Aging (NIA) and the National Library of Medicine (NLM) advanced the above guidelines

Box 13-4 25 "Senior-Friendly" Guidelines for Web Page Construction Recommended by the National Institute on Aging

1. *Phrasing:* Uses the active voice.
2. *Scrolling:* Avoids automatically scrolling text and provides scrolling icon.
3. *Mouse:* Uses single clicks to access information.
4. *Lettering:* Uses upper- and lowercase for body text and reserves all capitals for headlines.
5. *Justification:* Uses left-justified text.
6. *Style:* Uses positive phrasing and presents information in a clear manner without need for inferences.
7. *Menus:* Uses pull-down and cascading menus sparingly.
8. *Simplicity:* Uses simple language for text; glossary provided for technical terms.
9. *Typeface:* Uses san serif typeface that is not condensed.
10. *Color:* Avoids using yellow, blue, and green in proximity.
11. *Backgrounds:* Uses light text on dark backgrounds or vice versa; avoids patterns.
12. *Consistent layout:* Uses a standard page design, and navigation is the same on each page.
13. *Organization:* Uses a standard format; lengthy documents are broken into short sections.
14. *Navigation:* Uses explicit step-by-step navigation procedures; simple and straightforward.
15. *Help & information:* Offers a tutorial on the Web site or offers contact information.
16. *Icons & buttons:* Uses large buttons; text is incorporated with icon when possible.
17. *Text alternatives:* Provides text alternatives for all other media types.
18. *Illustrations & photos:* Uses text-relevant images only.
19. *Type weight:* Uses medium or boldface type.
20. *Type size:* Uses 12 or 14 point for body text.
21. *Site maps:* Uses a site map to show how site is organized.
22. *Hyperlinks:* Uses icons with text as hyperlinks.
23. *Animation, video, & audio:* Uses short segments to reduce download time.
24. *Back/forward navigation:* Uses buttons such as "previous" and "next" for reviewing text.
25. *Physical spacing:* Uses double spacing in body text.

Source: National Institute on Aging and the National Library of Medicine. (2002). *Making your Web site senior friendly.* Retrieved November 17, 2004, from http://www.nlm.nih.gov/pubs/checklist.pdf

one step further by developing specifications that are even more geared to the older adult Web user. They published *Making Your Web Site Senior Friendly: A Checklist* consisting of 25 empirically based guidelines for Web sites targeting these users (NIA and NLM, 2002). Research in aging,

cognition, human factors, and print materials led to the development of these guidelines that cover three areas of design: 1) designing readable text, 2) increasing memory and comprehension of Web content, and 3) increasing the ease of navigation. These guidelines for Web site design may result in greater accessibility to Web-based information for older adults, leading to a future willingness to explore the Web and increased enthusiasm toward technology.

Teaching about Accessing Web Sites

To begin teaching older adults how to access Web sites, the nurse needs to be knowledgeable about the capacity of the learner. The older adult must: 1) be oriented; 2) have an attention span and be capable of short-term memory; 3) not be agitated, combative, or destructive; and 4) be able to respond to one-step commands and make choices. For those individuals with severe motor disability, they must be able to raise an eyebrow; puff with the mouth; or tap with a finger, foot, or talk to make selections. Adaptive or assistive devices can be used to expedite the learning process. In 1991, McNeely identified eight factors affecting teaching-learning outcomes for Web-based instruction and older adults. Each factor is described and expanded upon in the following list:

1. The rate of presentation of information needs to be individualized. Older adults need training that is self-paced and includes ways to ask questions. Enough time needs to be given to perform the task (McNeely, 1991).
2. All new information needs to be presented in a highly organized manner. Initially, the task and end goals need to be introduced. Then, parts should be identified and each related to the preceding step(s) and to the whole. Visual displays should be simple and demonstrate only important information. Relevant information is presented and social chatter is avoided to help prevent the older adult from getting distracted.
3. Older adults need to feel that they can practice as much as they like without slowing the pace of the instruction. Thus, older and younger adults need separate training sessions. This will also prevent a situation in which older adults would hesitate to ask questions around younger people for fear of embarrassment.
4. There needs to be an opportunity for practice because it not only improves learning and mastery, but also has a direct influence on older adults' attitude. Unlimited trials need to be given. Cognitive support through use of software is important, because it offers nonthreatening and repetitive tutoring that does not judge a person's mistakes.
5. Web use that is interesting and personally meaningful to the older adult has been related to a positive attitude change. Older adults should dictate what they need and want from the Web. People perform best when the task is relevant to their lives.
6. Teaching older adults Web usage needs to be done in a comfortable environment. A calm, patient, unhurried, sensitive, interested, and knowledgeable instructor can decrease situational stress and promote a climate of acceptance and reassurance.
7. Step-by-step graphic instructions or even video demonstration rather than relying on manuals provided by vendors are help-

ful in teaching older adults. Use concrete language as often as possible, because it is absorbed more readily and efficiently than abstract information. Printing a hard copy of their work is beneficial. Seeing work in print may increase enthusiasm and a sense of productivity and provide stimulus for further participation.

8. Supportive verbal feedback may improve the older adult's performance. This should be done right after an activity. Interactive feedback via Web-based instruction may stimulate learning (McNeely, 1991).

Learning Activities

Many adults participate in Web-based learning activities that lead to increased interaction and shared learning. They use the Web to create their own letters and use e-mail, greeting cards, and posters in addition to playing word and board games and participating in music and art activities. In fact, Malcolm and associates (2001) found that most physically frail older adults primarily used e-mail, and that they also played games. E-mail letters provide an opportunity to reconnect with old friends and distant family. E-mail also can be used to resolve a billing question with a cable company, find out about services at a local volunteer organization, track down old classmates, or request information from a national organization. And it would be impossible to overstate the satisfaction older adults can feel when they are called "the coolest grandparent in the world" because they have sent an e-mail or e-greeting card or poster to a grandchild.

Online games and activities can be a fun way to engage the older person's mind when no one else is around. For example, Garfield (www.garfield.com) is an interactive Web site that can be used by all ages to play games, create electronic cards, or build their own comic strip. Jigzone (www.jigzone.com) is a jigsaw puzzle site containing hundreds of picture puzzle shapes with a controlled level of difficulty. There are also several joke Web sites (e.g., www.jokes.com and www.joke-of-theday.com) that are fun and easy to use. At the Web site www.fiftiesweb.com older adults can find the words to some of those common songs that they knew as young adults. The Web fulfills older adults' needs for fun and mental stimulation.

Health Information

The emphasis on early discharge and the movement of care from inpatient settings to the home mandates the development of electronic information systems to augment and extend services. The use of information searching on the Web is a promising tool for older adults. Information provided on the Web can help to inform and educate about acute illnesses, chronic conditions, and health promotion as well as resource availability. As previously mentioned, the ABLEDATA Web site can be used to locate companies that sell particular assistive devices. The National Institutes of Health and the U.S. National Library of Medicine currently maintain several Web sites designed to provide accurate health information to consumers. MEDLINEplus (www.medlineplus.gov) has sections in English and Spanish on health topics, medications, physicians, and medical terminology that are easy to use and understand. Information on this site can be accessed through alphabetical menus and through buttons and the search window. There is also a site from the National Institutes of Health (http://nihseniorhealth.gov) just for older adults that contains information on age-related

Box 13-5 Research Highlight

Aim: The primary aim was to test the feasibility of providing Caring~Web, a Web-based education and support intervention, to caregivers living in rural settings, including caregivers' satisfaction with the intervention. A secondary aim was to examine their experience of caring.

Introduction: After initial hospitalization and stroke rehabilitation, 80% of persons with stroke return to the community, relying on their family members' emotional, informational, and instrumental support for daily living.

Methods: Participants were given access to the Caring~Web site from their home via MSN/WebTV or a computer for 3 months. Each participant completed a bi-monthly telephone survey regarding use of Caring~Web and the experience of caring guided by Friedemann's framework of systemic organization. Data were collected from the interviews and the e-mail communications.

Nine adult caregivers of persons with stroke were enrolled during 2002–2003 in this descriptive study. They were chosen from rehabilitation centers in northwestern Ohio and southeastern Michigan.

Caring~Web provides education and support through: 1) an opportunity to ask a nurse specialist any questions; 2) a nonstructured e-mail discussion for caregivers; 3) Web sites about stroke; and 4) customized educational information.

Procedures were tested for use in a larger study and data were collected on the use of the intervention and the experience of caring.

Findings: Results indicated that all participants agreed that they were adequately trained and satisfied, in general, with Caring~Web. Seventy-eight percent of participants used the intervention 1–2 hours/week. Procedures were found valid for use in a larger study.

Using Friedemann's framework, a coding system was developed for the qualitative e-mail data on the experience of caring. Five main themes emerged: changing roles and solving problems (*system change and maintenance* in Friedemann's terms), seeing others' success or failure as own (*individuation*), pulling together (*coherence*), being spiritual (*spirituality*), and balancing successes/problems (*congruence*).

Conclusions: These findings help expand knowledge about caregivers of persons with stroke and laid the groundwork for a larger, comprehensive examination of outcomes from Caring~Web and further exploration of the experience of caring. The Caring~Web intervention helped caregivers understand the myriad of educational information that is available, and offered emotional and social support.

Source: Pierce, L., Steiner, V., Govoni, A., Hicks, B., Thompson, T., & Friedemann, M. (2004). Caring~Web: Internet-based support for rural caregivers of persons with stroke shows promise. *Rehabilitation Nursing, 29*(3), 95–99, 103.

Case Study 13-1

Roscoe Brown is a 73-year-old man who recently had a stroke that resulted in left hemiparesis. He was admitted to an acute care hospital where he was diagnosed with a right middle cerebral artery thrombosis. After a course of medication, the thrombosis dissolved and Mr. Brown demonstrated neurological gains. He has been transferred to the rehabilitation unit and has been assigned to your team. He can walk 50 feet with some assistance, his speech is slow and his words are slurred, but his short-term memory is intact. He owns his home and has $75,000 in a savings account that he is saving for a "rainy day." Just prior to his stroke, your team learned that Mr. Brown was the primary caregiver for his wife, Verna, who has senile dementia. The Browns have no children. Mr. Brown expressed a desire to get home as soon as possible so that he can once again care for his wife.

- Assuming that Mr. Brown is able to be discharged home and care for his wife:

1. What Web sites would you use to help in identifying community resources for Mr. and Mrs. Brown?
2. Discuss the community resources suggested to Mr. Brown.
3. What Web sites might be helpful for Mr. Brown in terms of education and social support for (a) stroke and (b) dementia?
4. What assistive devices might you suggest for Mr. Brown? Where did you find information about this equipment and/or devices, and, if appropriate, how would you teach Mr. Brown about their use?

- Assuming Mr. Brown is unable to return home and care for his wife:

1. Discuss home care and/or placement options for both Mr. and Mrs. Brown, including Web-based information about these options.

health topics, remedies, and help for caregivers. The Department of Health and Human Services (www.dhhs.gov) is a comprehensive source on health information, diseases, aging, and a resource locator. There is a nationwide locator service, called Eldercare Locator (www .eldercare. gov), that helps people find local services that are provided to older adults. Users simply enter their state and ZIP code, and the Eldercare Locator will link to information, referral services, and their state and area agencies on aging. These programs help consumers identify appropriate services in the area where they reside.

Healthcare Services

Beyond information searches, the Internet has other applications. For many years, traditional face-to-face support groups facilitated by nurses and other professionals have been used extensively with positive outcomes for persons and their family members dealing with chronic diseases and long-term illnesses (Broadhead & Kaplan, 1991). Web-based support groups managed by professional providers, including nurses, are gaining credibility, as positive outcomes are obtained (Larkin, 2000). Emotional and social support are gained by the participants in these Internet-based groups, in addition to information about best treatments, doctors, medical centers, and more (Veggeberg, 1996). According to White and Dorman (2000) and Northhouse and Peters-Golden (1993), members of Internet support groups share experiences and opinions that often include helping persons cope with body changes or providing encouragement to other group members, such as helping persons work through health care problems. For instance, national and local organizations and medical centers offer group discussion. The Wellness Community and the University of California at San Francisco (www.twcchat.org) are collaborating to test an online support group for caregivers of persons with Parkinson's. Researchers at a medical college in Ohio are testing Caring~Web, a restricted Web site geared toward providing education and support services for caregivers of persons with stroke (see Box 13-4).

Other Web sites are interactive and include monitoring devices that enable the person to send temperature, blood pressure, glucose levels, and other health data to health care providers electronically. Televisual Web sites allow health care providers to conduct virtual house calls with older adults (Spry Foundation, 2005). For example, Brennan et al. (2001) demonstrated the effectiveness of computer-mediated information and support services for patients recovering from coronary artery bypass graft surgery, and McKay, Glasgow, Feil, Boles, and Barrera (2002) suggested that Web-based information and support interventions exert a positive impact on health-promoting behaviors of patients with Type 2 diabetes.

Technologies on the Horizon

A number of organizations are testing computer-based technologies. These technologies have the potential to provide help for people dealing with chronic illness and disability. The practical application of these technologies may be especially important for older adults and their caregivers living in community settings.

Robotic Assistance

Two factors suggest that now is the time to establish mobile robots in the home-care arena. First, technology is available to develop robots that exhibit the necessary power, reliability, and level of competence. Second, now more than ever, there is a need for cost-effective solutions to maintain older adults in home settings. Researchers from the University of Pittsburgh, University of Michigan, and Carnegie Mellon University (2005) are collaborating to produce a personal robotic assistant for older adults called Nursebot. The goal of this project is to develop mobile personal service robots that assist older adults suffering from chronic disorders in their everyday life. An autonomous mobile robot "lives" in the private home of a chronically ill person. The robot provides a research platform on which to test out a range of ideas for assisting these adults, such as:

1. *Intelligent reminding:* Many older adults have to give up independent living because of memory loss. They forget to visit the restroom, to take medicine, to drink, or to see the doctor. One project explores the effectiveness of a robotic reminder, which follows people around, so they cannot become lost.
2. *Tele-presence:* Professional caregivers can use the robot to establish a "tele-presence" and interact directly with remote care recipients. This makes many doctor visits unnecessary.
3. *Data collection and surveillance:* Robots can be used for a wide range of emergency conditions that can be avoided with systematic data collection (e.g., certain types of heart failures).
4. *Mobile manipulation:* A semi-intelligent mobile manipulator integrates robotic strength with a person's senses and intellect. This mobile manipulation can overcome barriers in handling objects (e.g., refrigerator, laundry, and microwave) that currently force older adults to move into assisted-living facilities. This technology could be used for any person dealing with function problems, such as arthritis, as the main reason for giving up independent living.
5. *Social interaction deprivation:* This affects a huge number of elderly people who are forced to live alone. This project seeks to explore whether robots can take over certain social functions for these older adults.

If this project is successful, it could change the way health care is delivered to an ever-growing contingent of older adults, while significantly advancing the state of the art for mobile service robotics and human robot interaction (University of Pittsburgh, University of Michigan, and Carnegie Mellon University, 2005).

Sensor-Based Monitoring

Medical Automation Research Center (MARC), at the University of Virginia, has developed and is testing technological solutions for in-home distance monitoring of the functional abilities of older adults. The goal of this system is to enable older adults with disabilities to remain in their own homes for as long as possible. The system is composed of unobtrusive and low-cost sensors (no cameras or microphones) that detect movement and pressure. There is a data logging and communications module, in addition to an integrated data management system, linked to the Internet. Using the appropriate data analysis tools, important observations about activities of daily living can be made from the data generated by the monitored person. These observations may yield early indicators of the onset of a disease or a sudden change of activity (or inactivity) that can indicate an accident. Although the system is not meant as an emergency prompt system, the caregiver may receive alerts over the Internet or urgent notifications over the phone in case of such sudden accident-indicating changes. Additionally, there is a potential for information about sickness or accidents to be transmitted immediately to a service provider (MARC, 2005).

Intel's Assistance Program

The Alzheimer's Association and Intel Corporation have formed a consortium to spur development of technologies for the home to help support the care of older adults. This group grew out of several separate and ongoing efforts. In 2001, the Alzheimer's Association convened a group of caregivers as well as experts from diverse disciplines including bioengineering,

Box 13-6 Research Highlight

Aim: Using Friedemann's framework of systemic organization as a guide, this secondary analysis of data explored the narrative discussions of three older men caring for women with stroke.

Methods: The men participated for 3 months during January–September 2002 in Caring~Web, which provides Web-based support. These men were part of a larger study (n =10) examining the experience of caring for individuals with stroke. The sample was composed of three men, two spouses and one live-in friend, from northwestern Ohio and southeastern Michigan. Data were collected from bi-monthly interviews and e-mail discussions among the caregivers. Analysis of these qualitative data (n = 224 entries) followed established protocols; that is, data were reviewed as they were communicated and focused not only on individual semantic units, but also on zones of association.

Findings: Results revealed that these men were primarily dealing with role changes (*system change* in Friedemann's terms) and the women's depression and irritability (*incongruence*). The stroke event also fostered closer family ties and "being there" for one another (*togetherness*). Additionally, these men were supportive of each other as caregivers via the online discussion group.

Conclusions: Nursing practice on the Internet is mostly uncharted territory. These results begin to explore the complex experience of men caring for women with stroke.

Source: Pierce, L., & Steiner, V. (2004). What are male caregivers talking about? *Topics in Stroke Rehabilitation, 11*(2), 77–83.

robotics, artificial intelligence, communications, systems design, software engineering, medicine, nursing, biology, economics, finance, and business. Around the same time, Intel funded and conducted research on the ways in which computing and communications technologies could support the daily health and wellness needs of people of all ages in their homes and everyday lives. An example of Intel's technology is a wireless "sensor network" made up of thousands of small sensing devices that could someday be embedded throughout the home to monitor important behavioral tendencies, such as sleep and eating patterns. It could also send prompts to a person, such as reminders to take medication. Working together, one program that they are designing is to help persons with early-stage Alzheimer's disease to eat and drink while living in a home setting (Assisted Living, 2003).

Summary

Today's technologies provide many opportunities for older adults to maintain their independence and stay connected to the world even when functional limitations are present. Nurses should be aware of the latest trends in technol-

ogy, the use of computers among the older adult population, and how assistive devices help promote autonomy for this cohort. In addition, nurses can use the strategies suggested in this chapter to enhance learning and teaching with older adults by incorporating technology into the care of both well and ill elderly.

Critical Thinking Exercises

1. If someone stopped you on the street and demanded to know your definition of the Internet and World Wide Web, what would you say? Define the Internet in your own words. How is the Web different from the Internet? Discuss your findings with another student nurse in one of your clinical groups.
2. Explore the following Web sites: American Stroke Association (www.americanstroke.org) and National Stroke Association (www.stroke.org). What are differences and similarities between these Web sites? Discuss your findings with another student nurse in one of your clinical groups.
3. Discuss with students in your clinical group at least two factors affecting teaching–learning outcomes for Web-based instruction and older adults.
4. Describe an assistive device to students in your clinical group, and tell how you would teach the patient and/or caregiver about its use when discharging a patient to a home setting.
5. How can information be located about the assistive technology and assistive devices currently available for consumers' use?

Personal Reflection

1. Do you know an older adult who is a novice computer user? Interview this person: Ask how his or her life has changed (what is better and/or worse) since becoming a user. Think about how these changes may affect his or her quality of life.
2. How do you feel about older adults becoming part of the technology revolution? Do you feel that they are using the computer and World Wide Web more often? Do you know any older adults who use iPods, MP3 players, PDAs, Flash drives, or other gadgets used by the younger population today? How is their use the same as or different from your generation?

Glossary

Assistive device: Any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities.

Assistive technology: Technological tools used to access education, employment, recreation, or communication, enabling someone to live as independently as possible.

Augmentative and alternative communication (AAC): All forms of communication that enhance or supplement speech and writing, either temporarily or permanently *or* that involve the use of personalized methods or devices to aid a person's ability to communicate.

Emergency response system (ERS): A device that evaluates self-care and/or physiologic parameters and allows a person at high risk (for example an older person who lives alone and has a health problem) to get immediate help in the event of an emergency.

Environmental controls: Electronic systems that allow individuals to control lights, heating and cooling, and just about any electrical piece of equipment, such as curtains, garage doors, and gates, from a remote location.

Internet: A vast collection of resources that includes people, information, and multimedia and is best characterized as the biggest labyrinth of computer networks on earth.

Nursing informatics: A blending of computer, information, and nursing science designed to assist in the management and processing of nursing data, information, and knowledge to support the practice of nursing and the delivery of nursing care.

World Wide Web: A system of clients (Web browsers or software applications used to locate and display Web pages) and servers that use the Internet for data exchange.

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Section 7

Ethics (Competencies 18, 19)

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Chapter 14

Ethical/Legal Principles and Issues

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LEARNING OBJECTIVES

At the end of this chapter, the reader will be able to:

1. Define key ethical constructs as they relate to the care of geriatric patients.
2. Discuss concepts of ethics and the implications in the care of geriatric patients.
3. Recognize the influence of personal values, attitudes, and expectations about aging on care of older adults and their families.
4. Analyze the impact of fiscal, sociocultural, and medico-legal factors on decision making in the care of geriatric patients.
5. Identify strategies for facilitating appropriate levels of autonomy and decision making in the care of geriatric patients.

KEY TERMS

- Advance directives
- Advocacy
- Autonomy
- Beneficence
- Codes of ethics
- Competence
- Confidentiality
- Conflict
- Conflict of interest
- Cost-benefit analysis
- Dilemma
- Ethics of care
- Failure to rescue
- Fidelity
- Fiduciary responsibility
- Informed consent
- Justice
- Moral dilemma
- Moral distress
- Moral principles
- Moral uncertainty
- Nonmaleficence

- Paternalism
- Patient rights
- Quality of life
- Reciprocity
- Sanctity of life
- Values
- Veracity

Introduction

The **ethics of care** in the geriatric population, as in others, include compassion, equity, fairness, dignity, confidentiality, and mindfulness of a person's autonomy within the realm of the person's abilities and mental capacity. It is not possible to care for this population without being faced with difficult choices surrounding issues relating to the ability to live independently. Independence in the community requires some level of self-sufficiency in the management of medications, health care, driving, and maintaining and running a home (self-care, pet care, meals, housekeeping, shopping, banking, etc.). Self-sufficiency, issues of finance, and personal choices directly impact adherence to a plan of care.

These basic issues of autonomy are further challenged by the effects of aging and chronic disease on cognitive functioning and decision making. Advance directives, informed consent, and refusal of treatment are dependent on clarity of mind. Difficult choices call for judgments and serious consideration of what is right or best for patients, their families, and their communities. These personal choices are further compounded by social pressures associated with technological developments, options for end-of-life care, genetic research, and resource allocation. Technology and science have moved forward at their own paces without concern for consequences, asking not if something is needed, only whether or not it can be done (Coverston & Rogers, 2000).

Ethical concepts are principles that facilitate decision making and guide our professional behavior. They evolve from our beliefs and **values** and therefore have their foundations in religion, culture, and family expectations. Ethical decision making is driven by moral reasoning—our determination of what is right and wrong. Ethical concepts and personal values define our character and are expressed in our conduct and actions. Professional codes or standards within the profession of nursing help to define ethical actions. Changes in our social networks, including global awareness, cultural diversity, and advances in science, medicine, and technology, have created increasingly complex conflicts and dilemmas. Therefore, nurses must have a clear understanding of their own values and a strategy for decision making because personal beliefs may be quite different from the patient's, from the organization's values and expectations, or from the community's public rules.

Conflict and Dilemma

Conflict occurs when a choice must be made between two equal possibilities. Three types of moral conflict are described by Redman & Fry (1998). **Moral distress** occurs when someone wants to do the right thing but is limited by the constraints of the organization or society. **Moral uncertainty** defines the confusion surrounding situations in which a person is uncertain what the moral problem is or which moral principles or values apply to it. A **moral dilemma** arises when two or more moral principles apply that

support mutually inconsistent actions. A true **dilemma** occurs when it appears there are no acceptable choices. To qualify as a dilemma, there must be active engagement in the situation that forces an evaluation of and need for choices. Actions are uncertain because alternatives are equally unattractive (Sletteboe, 1997). **Case Study 14-1** provides an example of a dilemma.

Dilemmas are inherent in the health care of the geriatric population, creating ethical problems for those providing care. Differences in values and opinions can lead to conflicts between caregivers and health care providers and is more common in diverse communities where cultural values may be quite different (Ellis & Hartley, 2004). There are seldom perfect solutions to ethical dilemmas. Those forced to make them are often required to justify their decisions and actions. Some conflicts are resolved through dialogue, others are legislated, and others are defined by agreements regarding basic rights. Many health care organizations utilize ethics committees to resolve such dilemmas in real time.

Moral Principles

Moral principles are incorporated into professional **codes of ethics**, organizational value statements, and position statements published by professional groups such as the American Nurses Association (ANA). The ANA posts the *Code of Ethics for Nurses* on its Web site at www.nursingworld.org/ethics/ecode.htm. This code forms the cornerstone of nursing practice. The purpose of this code is to provide nurses with tools for identifying ethical responsibilities and to guide decision making within the primary goals, values, and obligations of the profession (Hook & White, 2003). The ANA has issued many position statements speaking to ethics and human rights, and is currently active in addressing issues of genetic research, confidentiality, privacy, managed care, health services for undocumented persons, and the system's impact on the profession of nursing using moral principles and *Nursing's Agenda for Health Care Reform* as a guide for action (ANA, 2005b). A nurse's understanding of moral principles facilitates ethical decision making in daily practice.

Advocacy

Advocacy refers to loyalty and a championing of the needs and interests of others requiring the nurse to educate patients and their families so that they know their rights, are fully informed, and are able to access all the benefits they are entitled to (Hoeman & Duchene, 2002). Advocacy is implicit in the social contract between the profession of nursing and society and is based on other ethical concepts such as justice and autonomy (Falk Rafael, 1995). Our increasingly complex health care system often calls for advocacy

Box 14-1 Moral Principles

Advocacy
Autonomy
Beneficence/nonmaleficence
Confidentiality
Fidelity
Fiduciary responsibility
Justice
Quality of life
Reciprocity
Sanctity of life
Veracity

Case Study 14-1

Mr. Bowen is 64 years old. He has been very healthy by report and very active working as a dairy farmer. He had a stroke affecting his right side 2 weeks ago and currently has a moderate leg weakness with a more significant arm weakness, slurred speech, and mild dysphagia (swallowing difficulty). He is predicted to be ambulatory with a cane, though prognosis of arm function returning is more guarded. It is likely he will improve speech function and swallowing ability but will require some specialization of diet to prevent aspiration.

Mr. Bowen has chosen to stop eating, stating that he does not want to live as an invalid. His family is very distressed and wants him to be forced to eat. They cannot imagine why he has made this choice when his prognosis is so good compared to others they have seen in the rehabilitation setting with much more severe deficits. He has been evaluated for depression and an antidepressant has been recommended, which he refuses to take along with all other medications recommended for his newly diagnosed cardiovascular disease. Mr. Bowen is oriented and has not had competence questioned prior to taking this stand.

Some of the staff supports his decision and others do not. Discussion with the family reveals that Mr. Bowen has frequently made deriding remarks about persons with disability, including remarks like "If I ever end up that way, just take me out behind the barn and shoot me." The psychologist comments that Mr. Bowen is frankly depressed and that part of this depression is related to the location of his stroke. He also points out that he feels strongly that should the depression be resolved, Mr. Bowen would likely change his opinion.

1. How is this situation best handled?
2. Does Mr. Bowen have the right to refuse to eat and take medications when he is clearly not in an end-of-life situation?
3. How does the team resolve the situation when the depression is so prevalent and he refuses treatment for it?
4. Will you be able to care for Mr. Bowen if his wishes are granted?

efforts to help patients and families negotiate it and receive appropriate services. Nurses also advocate for patients by supporting them in their efforts to retain as much autonomy as their abilities allow. At times, nurses advocate for the expressed desires of the patient within the context of team and family discussions in which the patient is not present, assuring true representa-

tion of the patient's desires when known. Other situations require advocacy efforts to prevent abuse, neglect, and exploitation.

Advocacy also refers to maintaining the status of safe care. The nurse is committed to the well-being of the patient and thus must take appropriate action in the event that incompetent, illegal, unethical, or impaired practice puts a patient at risk. Nurses are obligated to address the issue with the person involved and, if necessary, with higher authorities so that patients are not placed in jeopardy (ANA, 2005a). Most health care organizations have processes in place for reporting and managing such behaviors. Utilization of official channels reduces the risk of reprisal against the reporting nurse (ANA, 2005a).

Autonomy

Autonomy is the concept that each person has a right to make independent choices and decisions. It is reflected in guidelines and laws regarding patient rights and self-determination. Inherent in the concept of autonomy is respect for another and their decisions and that each person should be treated with dignity as a unique individual with inherent worth. Evidence of respect for autonomy is found in care that considers the patient's lifestyle, value system, and religious beliefs. Such respect does not mean that the nurse condones those beliefs or choices, but rather that the nurse respects the patient as a person with autonomy and rights (ANA, 2005a). Autonomy may be limited by cognitive deficits that impair clarity of thought and the ability of the patient to make decisions.

Autonomous choices are based on values and experiences. In order for patients and their families to make sound choices, they must have appropriate resources and information available. Thus, autonomy is supported by **informed consent** and patient and family education. Informed consent means making sure that consent has been granted, not assumed, following an educational process that facilitates the weighing of benefits, risks, and available options (Aveyard, 2005). Informed consent is not compliance, but assuring that voluntariness is honored.

Although consent is not required for routine activities for which the risks are commonly understood, patients often comply with actions and activities during nursing care procedures because they believe that that is what is expected of them (Quallich, 2004). This does not mean that they have provided informed consent for those activities not considered routine by the patient. All too often nurses discover that patients do not really understand why they are

Box 14-2 Informed Consent

Elements to include in discussion:

- The specific condition requiring treatment
- The purpose and distinct nature of the procedure or treatment
- Potential complications or risks associated with the procedure or treatment
- Reasonable alternatives with a discussion of their relative risks and benefits
- Discussion of the option of taking no action
- The probability of success of the recommended treatment or procedure

Source: Adapted from Quallich, S. A. (2004). The practice of informed consent. *Urologic Nursing, 24*(6), 513–515.

doing something that was prescribed by a health care provider. We often err by assuming they understood and provided consent because they were participating (Aveyard, 2005).

Unmistakably, autonomy also means that nurses and other health professionals can educate, provide support, and provide resources, but they cannot force compliance with recommended treatment. Thus, it is important to recognize that informed consent also means that consent can be denied, can be withdrawn after it has been given, and that such requests should be respectfully honored. Refusal of treatment is a patient right. Care should be taken that health care providers do not abuse their power in the relationship by persuading patients to comply with recommended treatment. Patients and their families have been badgered into agreeing to an intervention that they did not want to pursue (Aveyard, 2005). It is important to recognize the impact of previous experiences on choices made by patients and to actively address barriers through support and education.

Conflicts around autonomy can occur with issues of chronic or life-threatening illness, when patients and family members fail to conform to expected behavior patterns, or when they disagree with the recommendations of professionals. Patients are labeled noncompliant and families are labeled dysfunctional. **Paternalism** has been prevalent in the medical field, and health care providers, including nurses, are at risk for paternalistic behavior when patients are perceived as difficult to work with. Paternalism is easily supported by the distribution of power in relationships with patients and families in many health care settings. Paternalism fails to support autonomy and limits the development of trusting partnerships. The best outcomes are achieved when autonomy is supported through a shared responsibility for decision making that allows the patient and family to be vested in the plan.

The burden of health care has been steadily shifting to the community. Nurses and other health care providers are wise to invest in the development of strong relationships and partnerships with family caregivers. This ethic of negotiation and accommodation means providing information in a timely manner in a way that is easily understood. It means taking the time to prepare and train the patient and caregiver for both the technical and emotional aspects of their changing roles. And, it means being compassionate about their anxiety, suffering, and hard work. Caregivers need direction, guidance, and support in defining their roles and responsibilities in patient care and decision making. They also need support and permission to set fair limits on their sacrifices, supporting their autonomy and conditions of choice (Levine, 2000).

Beneficence/Nonmaleficence

These concepts of *do good* (**beneficence**) and *do no harm* (**nonmaleficence**) are integral to health care. Nurses intend to do good for their patients. Nurses are also concerned about situations that can result in harm to patients, such as understaffing. Consider the situation on a busy medical unit where a nurse does a cursory assessment due to workload demands and the apparent comfort of the patient on rounds. The patient is a very social and talkative elderly woman who has had a recent crisis with heart failure and is having her medications adjusted. She has become significantly deconditioned and has spent much of the last couple of weeks in her recliner prior to admission. Near the end of the shift the patient complains of severe chest pain and anxiety. An

emergent work-up determines that she has a deep vein thrombosis with pulmonary embolism. Is this an example of maleficence (doing harm)? Obviously, purposeful behavior such as administering a lethal dose of medication is an example of maleficence, but where does failure to rescue fall on the ethical scale?

Failure to rescue refers to effectiveness in rescuing a patient from a complication versus preventing a complication (National Quality Measures Clearing House, 2005). A summary of data compiled in 1997 by the Healthcare Cost and Utilization Project State Inpatient Database for 19 states showed a failure to rescue rate of 148.4 per 1,000 persons at risk (National Quality Measures Clearing House). Failure to rescue data are collected by measuring the number of deaths occurring out of those discharges with potential complications of care listed in the failure to rescue definitions (pneumonia, deep vein thrombosis/pulmonary embolism, sepsis, acute renal failure, shock/cardiac arrest, or gastrointestinal hemorrhage/acute ulcer). It is a patient safety quality monitor for the Institutes of Health and Agency for Healthcare Research and Quality. Failure to rescue has many causes, from situations as simple as educational background, inexperience, and lack of knowledge to more complex issues such as attitudes towards work, staffing patterns, and resource allocation (**Case Study 14-2**). It can be an issue of omission as much as an issue of commission. It behooves all nurses to think carefully about the issue of failure to rescue and to investigate practice situations so that such circumstances are not issues of maleficence.

Confidentiality

The ANA Code of Ethics (2001) emphasizes respect for human dignity that is demonstrated in daily work. This includes respect for privacy

Case Study 14-2

Mr. Jacobs, a young-acting 72-year-old who is rather obese, was admitted for trauma following a motorcycle accident in which he broke his femur. He is 24 hours post op and has requested pain meds at 0400. The medications were given, and the nurse glanced in the room 2 hours later and noted he appeared to be sleeping. At 0700, the nurse on the next shift enters the room and turns on the light to see the patient is cyanotic and difficult to arouse. Aggressive stimulation and oxygen revived him. Discussion with the patient noted a history of sleep apnea that appeared to be worsened by the effects of the pain medication.

1. Was this a near miss or failure to rescue?
2. Did the night shift nurse adhere to principles of beneficence and nonmaleficence?
3. What should the nurse have done differently?

and maintaining **confidentiality**. There is so much value placed on the concept of confidentiality that it is considered a right—the right to privacy. The right to privacy has been inferred from the U.S. constitution but has been legislated more directly in recent years by the Health Insurance Portability and Accountability Act (HIPAA).

Driving forces for these laws relate to the spread of socially stigmatized diseases such as AIDS and concerns over the large volumes of information transmitted electronically containing sensitive material, detailed descriptions of interactions with health care workers, and genetic data that can result in potential invasions of privacy or be utilized for discrimination in the workplace or denial of insurance coverage (Ellis & Hartley, 2004). HIPAA requires that providers educate their patients regarding their rights under HIPAA and that they release only information that the patient specifically designates as sharable with others. HIPAA regulations protect privacy so strongly that even admitting that the patient is in your care is a violation unless the patient has expressly agreed that such information can be shared. This has changed many practices related to confidentiality in health care settings.

HIPAA has legislated the concept of confidentiality inherent in practice by requiring that only persons with a need to know access the patient's record or receive information about the patient. Nurses are entrusted with personal information in the course of providing care that should be shared only as necessary to facilitate that patient's care. In addition to the personal responsibility for protecting privacy, legal ramifications for failure to comply with this law are steep; the nurse should be well informed of organizational guidelines for compliance with this regulation. Health care providers can be held liable for harm that results from sharing information without permission. Nurses should be able to easily access appropriate administrative personnel in the event that a request for patient information is questionable.

Fidelity

Fidelity refers to keeping promises or being true to another; being faithful to commitments and responsibilities (Ellis & Hartley, 2004).

Box 14-3 Resource List

The Agency for Healthcare Research and Quality: www.ahrq.gov. An excellent site for tracking and learning about quality of care initiatives that support autonomy, safety, and appropriate access to care.

The American Hospital Association: www.aha.org. *The Patient Care Partnership: Understanding Expectations, Rights and Responsibilities*: www.aha.org/aha/ptcommunication/partnership/index.html. An excellent resource for involving patients in their care.

The American Nurses Association: www. nursingworld.org. Contains multiple sections on ethics in nursing.

National Quality Measures Clearing House: www.qualitymeasures.ahrq.gov. Learn about the quality measures that reflect data on failure to rescue and many other topics.

The Phoebe R. Berman Bioethics Institute at Johns Hopkins University: http://www.hopkinsmedicine.org/bioethics. A wealth of information on bioethics, including discussions on genetic research.

Fidelity is particularly important in the care of geriatric patients because of the amount of trust they put into the health care system. Fidelity is also important in relationships with team members and the organization at which the nurse works. The team and the organization need to be able to trust the nurse to keep promises and honor relationships with them. Trust is earned, and fidelity is demonstrated in daily work and the relationships therein.

Fiduciary Responsibility

In this age of diminishing health care resources it is important that all nurses have an understanding of the costs and benefits of care that is given. Health care professionals have an ethical obligation to good stewardship of both the patient's and the organization's funds—**fiduciary responsibility**. This refers to using both fiscal reserves and caregiving resources wisely, potentially requiring a **cost-benefit analysis** to facilitate decision making. It becomes more difficult to deal with persons who are noncompliant or who have conditions that could have been prevented through healthier lifestyles as resources and manpower decline (Hoeman & Duchene, 2002). For many, rehabilitation and other special health care programs are not a right, they are a privilege that is rationed and controlled by those who control funding.

Justice

Fiduciary responsibility and fidelity are some of the moral principles that help to determine what is just. **Justice** refers to the fairness of an act or situation. Health care is replete with issues of justice. Is it just for one patient to receive rehabilitation following a stroke and another to be sent to a nursing home without acute rehabilitation? Is it just for a person who has attempted suicide and severely damaged his liver to receive a transplant before another who has been patiently waiting for the same liver? Who decides what is just and right? Does age make a difference? Why should one person receive more resources than another? Is the government responsible for providing resources to those unable to provide for themselves?

Many geriatric patients depend on Medicare and Medicaid for insurance, so nurses in the field of geriatrics should conscientiously follow the government's efforts to determine just distribution of its dollars. The Medicare Prospective Payment System has been mandated by the Balanced Budget Act of 1997 and requires strict accounting for where its dollars go in postacute care. This has led to a redistribution of services and limiting of access to home health, outpatient, and rehabilitation services for the geriatric population.

This situation quickly reinforces the issue of access, of whether we all deserve the same sort of care and who should decide what that care should be. Care of geriatric patients is burdened with age-related biases regarding resource allocation and rationales for resource allotment. Resources are limited. Elderly persons are usually on fixed incomes with restricted benefits and strict criteria for access to services, especially supportive assistance in the home. This increases the burden on caregivers, creating a difficult, isolated, and often unsupported role (Hoeman & Duchene, 2002). Success in this role is further hampered by the complexities of the system and limitations on time spent with patients and caregivers.

Levine (2000) comments that caregivers lamented the incomplete information they received regarding basic information about diagnosis and prognosis, key elements of the treatment plan, side effects of medication, symptoms to watch for at home, and whom to call for assistance or prob-

lems. Others have reported difficulties with compliance and learning about their loved one's care needs due to conflicting information from health care providers. One also has to question the justice in a system that impairs the caregiver's ability to learn because professionals share information in such hurried and technical manners that anxious and stressed caregivers can hardly be expected to absorb it (Levine, 2000). These failures in communication hardly support a fair or just health care system; rather, they contribute to serious problems that can increase both morbidity and mortality.

Quality and Sanctity of Life

The issues of justice and access to care remind us that many decisions regarding self-determination and autonomy are related to **quality of life**, or one's personal perception of the conditions of life, and **sanctity of life**, referring to the value of life and the right to live. Quality of life is a perception based on personal values and beliefs. Views on quality of life are widely variable and likely to change when circumstances differ. They are influenced by emotional, physical, economic, and social needs. Quality of life is enhanced by prevention and management of chronic disease through preventive care, support for healthy lifestyle choices, education, and home evaluations to reduce risk of injury. However, even the best nurse cannot prevent injury or reduce risk of complications in those who continue to make unhealthy choices or fail to heed health or safety recommendations (Hoeman & Duchene, 2002). Some quality-of-life decisions are made in direct relation to the burden being placed on others. Sometimes it is not the big things such as limitations in mobility that cause the greatest burden on quality of life, but rather the indignity and emotional burden associated with problems such as incontinence and dependency.

Sanctity of life supports the belief that all life is of value and that this value is not based on how functional or effective a person's life is, simply that we all have a right to life. The meeting of personal perspectives on quality and sanctity of life can thus be expressed in an individual's advance directives. Conflicts in health care are rife with issues related to values surrounding sanctity of life and end-of-life care issues. The ANA (2005a) has addressed this directly in the *Code of Ethics for Nurses*, stating that nurses may not act with intent to end life but may support and act on well-thought-out decisions regarding resuscitation status, withholding and withdrawing of life-sustaining care including nutrition and hydration, and aggressively managing pain and other symptoms at the end of life even if such care hastens death.

Reciprocity

Reciprocity is a feature of integrity concerned with the ability to be true to one's self while respecting and supporting the values and views of another. Living according to this principle is particularly important when values and views are different. Nurses need to be impartial once a plan of care is agreed on, actively facilitating achievement of intended goals and outcomes. Passive resistance does not support reciprocity or trust. If a nurse or other health care provider cannot demonstrate reciprocity, another should take his or her place in the care of the patient.

Veracity

Veracity means truthfulness and refers to telling the truth, or, at the very least, not misleading or deceiving patients or their families. Veracity forms the basis of informed consent—without truthfulness and an explanation of options, the patient cannot possibly make the best choice. Failure to be truthful impairs trust and reliability (Ellis &

Hartley, 2004). But issues of truthfulness create conflict as well. Do you tell the truth when you know it will cause harm or distress? How do you maintain hope while sharing a poor prognosis? It is possible to support hopefulness and decrease stress with truthfulness through careful choices of words. It is as simple as the difference between simply stating, "You will not likely walk again considering the severity of this stroke" and compassionately saying "It will take considerable work and fortunate healing of your brain in order for you to walk again, but we will work with you and see what happens."

Patient Rights

Patient rights direct actions on ethical issues in the care of geriatric populations. The concept of rights forms the basis of many of our laws and is indeed the basis for the foundation of the U.S. constitution. Rights are considered basic to human life, and each person is entitled to them on a legal, moral, or ethical basis (Ellis & Hartley, 2004). Over the last several decades considerable effort has been put into defining patient's rights. These rights are defined by organizational values, accreditation standards, professional codes, and legislative guidelines. The American Hospital Association has published a document addressing patient rights and hospital responsibility, entitled *The Patient Care Partnership: Understanding Expectations, Rights and Responsibilities,* in an effort to define these rights and to hold hospitals and patients accountable to them. This document is available at www.aha.org/aha/ptcommunication/partnership/index.html.

Rights also evolve as values within a cultural or social group change. The right to decide what can and cannot be done to a person evolved as a legal definition due to a malpractice lawsuit in 1957 (Quallich, 2004). The right to effective pain management has evolved due to changes in perception and studies assessing the impact of poor pain management on outcomes. This development was supported by the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) when it added accreditation standards related to effective pain management and by rulings of the courts related to failure to manage terminal pain (Furrow, 2001).

Advance Directives and Living Wills

The most fundamental patient right is the right to decide. The Patient Self-Determination Act of 1990 was enacted to reduce the risk that life would be shortened or prolonged against the wishes of the individual. Following the belief that each has a fundamental right to decide (autonomy), this law requires that patients are provided the opportunity to express their preferences regarding life-saving or life-sustaining care on entering any health care service, including hospitals, long-term care centers, and home care agencies. The law also requires that adequate information be supplied to the patient so that informed decisions regarding self-determination are made.

Decisions regarding life-saving or life-sustaining care are recorded in legal documents known as **advance directives.** Advance directives describe actions to be taken in a situation where the patient is no longer able to provide informed consent. Living wills are alternative documents that direct preferences for end-of-life care issues providing an "if . . . then . . . " plan. They often include what type of care to provide and whether resuscitation measures should be taken. The "if" condition (e.g., If I am terminally ill and not expected to recover) must be confirmed by a physician (Ellis & Hartley, 2004). Laws vary from state to state regarding living wills, and some require two

physicians to agree to the status of the patient before enacting directives. In states where living wills have been enacted into law, health care providers who do not agree with a patient's directives must remove themselves from the case (Ellis & Hartley, 2004). Remember that living wills are equally as likely to indicate that resuscitation efforts be limited as they are that all possible efforts be taken.

Durable Power of Attorney

A living will may include a durable power of attorney, a legal document designating an alternative decision maker in the event that the person is incapacitated. This document supersedes all other general legal designations for decision makers. In other words, a patient may designate a close friend with durable power of attorney, superseding the designation of immediate family members in decision making in a situation where the patient is incapacitated. The living will in this situation provides direction to the decision maker. The use of a durable power of attorney can decrease conflicts between family members and allows the designated decision maker to perform in roles negotiated in advance with the patient (Ellis & Hartley, 2004).

The absence of a living will or "do not resuscitate" order requires that all possible efforts at resuscitation should be initiated. Care of the incapacitated person is greatly simplified by an advance directive or living will. However, the issues of paternalism and boundary violations can cause ethical conflicts in the pursuit of such directives if not handled empathetically. It is imperative that information be supplied in an ethically appropriate manner for each patient because the manner in which alternatives are discussed greatly influences choices made (Elliot & Hartley, 2004). Cultural values influence decisions made as well as the way in which decisions are made. Whereas one family may see the decision as solely up to the individual involved, others may feel it is a family decision because of duty, compassion, or the concern of those ultimately assuming the burden of care. The nurse supports the preferences of the patient in resolving self-determination issues.

Competence

Competence refers to one's clarity and appropriateness in decision making. Competence must be present for persons to exercise autonomy and their right to decide. Inherent in autonomy is the right to choose, the right to be informed, and the right to refuse treatment, including whether to participate in research. Loss of competence due to impaired memory or sensory function significantly impacts one's ability to make such informed decisions. There is a difference between being declared legally incompetent and situations of evidence of impaired competence that may be transient due to health problems or side effects of medications. Legal competence is determined by the courts, and if a person is deemed legally incompetent a legal guardian is appointed.

Informed consent means that the person clearly understands the choices offered. Problems develop when one no longer has the capacity to make health care decisions. Nurses should involve patients in the planning of their own health care to the extent that they are able to participate. But what do we do when the patient is confused and refusing care that is necessary for both comfort and health? Do we perform that care against the person's will, documenting that clarity of thought was limited? We do. Under our ethical standards, we are equally obligated to provide the best care under the circumstances (ANA, 2005a). This default condition becomes uncomfortable for many nurses when the patient

is combative or agitated with the care being delivered (Aveyard, 2005). Discomfort can be reduced and confidence in proceeding enhanced by discussing such care with designated decision makers. Each state has laws indicating who is designated as a decision maker in the event a person becomes confused, unconscious, or considered incompetent to make informed decisions. Organizational guidelines are established in line with these laws to guide staff in management of such situations. If a physician determines that a person is no longer competent for such decision making, it should be noted in writing with an explanation of the probable cause and its likely duration. This allows the nurse to follow legal and institutional guidelines for using an advance directive or alternative decision maker (Butler, 2004).

Assisted Suicide

Another ethical issue of self-determination and autonomy is that of assisted suicide. As Hoeman and Duchene (2002) comment, if "social values dictate beliefs about self-determination and life satisfaction, persons with chronic, disabling disorders are at risk for promoted suicide even if they are not terminally ill. Hospice and palliative care are rejected in favor of aids to rapid death" (p. 53). Refusal of treatment is considered a right and protected under self-determination directives. The recent movement towards legislation regarding assisted suicide forces the judgment of when suicide should be used on the basis of health status, age, or other attributes and counters the ethical principle on which self-determination is based (Hoeman & Duchene, 2002). Does this create the potential of targeting those with severe disabilities whether the condition is terminal or not? Does it create a double standard for treatment and survival? Is it a plan of managing devalued persons (Hoeman & Duchene)? The ANA published a statement on assisted suicide in 1994 and does not support it in any form, stating that it is a violation of the Code for Nurses. Instead, it is suggested that nurses focus on providing competent, comprehensive, and compassionate end-of-life care (ANA, 1994). Chapter 22 of this text focuses on such care of elders at end of life.

Box 14-4 Recommended Reading

Mathes, M. (2004). Ethical decision making and nursing. *MEDSURG Nursing, 13*(6), 429–431.

Slettebo, A., & Bunch, E. H. (2004). Solving ethically difficult care situations in nursing homes. *Nursing Ethics, 11*(6), 543–552.

Ethics in Practice

Ethical dilemmas and conflicts surround us in real life, and ethical principles alone are not likely to address many of the quandaries and dilemmas occurring in the care of geriatric patients. Living by these principles requires reflection and consideration of one's own beliefs and how they interface with the professional code of ethics, organizational statements, and beliefs of patients in the community in which the nurse practices. Nurses must prepare for such dilemmas by considering the influence of their own personal values, attitudes, and expectations about aging on the care of older adults and their families. Without such reflections, the patient may lose autonomy, the right to self-determination, and justice.

Nurses must learn how to assess competency as related to specific features of care in the geri-

atric population. Developing skills in probing the expressed wishes of patients and advocating for those wishes to be followed facilitates respect and the honoring of self-determination. Nurses also need to recognize that clarity of thought is fluid and lucid moments can return or appear. These moments should be recognized and viewed as opportunities for discussion. Nurses, as patient advocates, also bear responsibility for effective communication of a patient's preferences through documentation and reporting processes. They are also responsible for creatively thinking about and problem-solving situations that limit functional status and safety to support quality of life and independent living. Nurses caring for children and younger adults bear a responsibility to facilitate healthy life choices to minimize future health complications, including being good role models of healthy behaviors themselves.

Mistakes

Mistakes happen, and happened more often than the public was aware of prior to the 2000 report by the Institute of Medicine that stated such errors are common and often life threatening (Kohn, Corrigan, & Donaldson, 2001). Since that time, considerable effort has been put into reducing mistakes and improving patient safety. However, even the most conscientious nurse will make a mistake or two. Responding to mistakes is intimidating, embarrassing, and risky for most. Ethical responses to mistakes include:

Box 14-5 Research Highlight

Aim: The purpose of this safety page from the Food and Drug Administration was to report on findings from the database regarding reasons for medication errors.

Methods: Statistics from the FDA database were reviewed and classified according to the Taxonomy of Medication Errors developed by the National Coordinating Council for Medication Errors Reporting and Prevention (NCC-MERP).

Findings: In one month in 2001, 273 medication error reports were received by the FDA. Of these, 129 were serious (life-threatening, fatal, disabling) and 136 were not serious. The most common causes for errors were human factors (42%), labeling problems (20%), and communication problems (19%). Twenty-two percent of errors involved the wrong drug being given, and 17% involved a wrong dose.

Conclusion: Although the authors of this article did not draw any conclusions, but merely summarized data, nurses should be reminded from this summary of drug safety to be sure to check the five rights of medication administration: right dose, right time, right patient, right route, and right medication. By assuring the five rights with each patient interaction in administering medications, most errors can be prevented. Nurses have an ethical and moral obligation to protect patients by ensuring safe administration of medications.

Source: Thomas, M. R., Holquist, C., & Phillips, J. (2001, October 1). Med error reports to FDA show a mixed bag. *MedWatch*.

- Honestly admitting the error occurred in a neutral and objective manner
- Taking proper steps to correct the situation
- Apologizing for the mistake
- Making amends as possible
- Evaluating how to prevent such mistakes in the future

Disclosure of mistakes in an honest and willing manner reduces the threat of the situation and also reduces the threat of liability (**Case Study 14-3**). Honesty and humility decrease the mental anguish of those who make errors in practice (Crigger, 2004). Compassionate and caring relationships with team members create support systems in which health care providers can help each other weather such storms.

Conflict of Interest

Conflict of interest situations arise from competing loyalties and opportunities. This may include conflicts of values between the nurse's value system and choices made by the patients, their families, other health care team

Case Study 14-3

Jane is a junior-level baccalaureate nursing student who is doing her clinical rotation in a long-term care facility. She is assigned to care for a resident who occupies a double room, 111-2. The resident assigned to Jane is named Iva Wittacker, and Iva's roommate is Ida Wallace. Both residents are elderly women and have the same initials. While passing out medications, Jane asks the nursing assistant to identify Ms. Wittacker, because the residents do not wear armbands, Ms. Wittacker's picture is missing from the medication book, and Jane has not cared for this resident, in the past. The CNA points to a white-haired woman in room 111. Jane administers the medications to the resident, and then her roommate enters the room and asks where her pills are. Jane asks the woman's name and she states she is Iva Wittacker. Jane realizes that she has administered medications to the wrong resident.

1. What should Jane do immediately in this situation?
2. What could and should have been done to prevent such an error from occurring?
3. Who is responsible for Jane's mistake? What about accountability of the facility, the CNA, and/or the clinical instructor?
4. What are the ethical and legal implications in this situation?
5. Discuss what might happen if this mistake occurred in the facility where you are practicing.

members, the organization, or the insurance company. This is particularly evident in discussions related to resource allocation and end-of-life care. Other conflicts occur when incentive systems or other financial gains create conflict between professional integrity and self-interest. Nurses should facilitate resolution of conflicts by disclosing potential or actual conflicts of interest or withdraw from participation in care or processes that are causing the conflict (ANA, 2005a).

Summary

Nurses must respect the worth, dignity, and rights of the elderly and must provide care that meets their comprehensive needs across the continuum. Their fundamental commitment to the uniqueness of the patient creates opportunities for participation in planning and directing care. Their vigilance in advocating for dignified, just, and humane care establishes a standard that can be appreciated, and potentially needed, by all of us. It is not the rules and regulations that create ethical care delivery; it is the little actions done by each and every nurse in every day of practice.

As nurses, each of us is held to the ethical standards of practice of our profession (Esterhuizen, 1996). Providing respectful care that puts the patient's safety and welfare first helps us to avoid situations that can result in failure to rescue, abuse of power, exploitation, and overinvolvement (Ellis & Hartley, 2004). Developing a framework for ethical decision making provides a foundation for discussion when dilemmas present themselves, smoothing the way for integrity-saving compromise. The nurse's conscientious effort to follow ethical standards in daily practices supports the quality of care we all want to experience.

Personal Reflection

1. As you prepare to care for older adults, what values, conflicts, or ethical dilemmas do you anticipate you will face?
2. Assess your feelings about the right to die and assisted suicide. Do you agree with the ANA's stand on this issue? How would you respond in the event that an elderly patient asks "please help me die" when death is not near?
3. An elderly person is becoming unsafe living alone and has been identified as at risk for serious injury. During admission to an alternative living setting, the person appears oriented and appropriate. Furthermore, the person expresses disagreement with the recommendations for this admission. How would you respond in this situation?

Critical Thinking Exercises

1. Are your patients truly informed about their care? Ask five patients why they are taking the medications they are prescribed, and evaluate their responses.
2. Mrs. Gomez is confused and at times combative. Her family regularly visits and is actively involved in her care. She has been agitated and wandering the unit for the last several days and has not had a bowel movement for 6 days. She is constantly complaining of stomach pain and refuses all oral or rectal medications to facilitate bowel emptying. Her bowel sounds are diminished, and a hard mass suspected to be stool can be felt in the descending colon. Will you restrain her and give her an enema to prevent further complications?
3. You see a good friend while you are shopping at the mall. She inquires, "Hey, is my aunt on your unit? Can you tell me how she is doing? I just haven't had the time to get over and see her." How do you respond?
4. You answer the phone and a woman, indicating she is the daughter of your patient, asks you about her status. How will you respond considering confidentiality and privacy issues?
5. You observe a fellow nurse undressing an elderly woman and restraining her hands. The woman has been crying and yelling out for much of the night and is obviously confused. She leaves the woman naked on the stripped bed and walks out of the room, closing the door behind her and commenting as she passes you, "There, let her wet herself all night, I am done with her." What should you do?

Glossary

Advance directive: Legal document that records decisions regarding life-saving or life-sustaining care and actions to be taken in a situation where the patient is no longer able to provide informed consent.

Advocacy: The act or process of pleading the case of another.

Autonomy: Referring to self-governance or self-directing freedom, being in charge of one's own being, having moral independence.

Beneficence: Doing or producing good.

Codes of ethics: Codes of moral reasoning used by members of a profession to direct the moral behavior of their work.

Competence: Having the capacity to function or respond, having requisite or adequate abilities or qualities to perform a task or respond to a situation. Mental competence is evaluated to determine if a person has adequate capacity to make informed decisions.

Confidentiality: Being entrusted with confidences. Maintaining confidentiality is required to protect the right of privacy.

Conflict: Occurs when a choice must be made between two equal choices.

Conflict of interest: Conflict that arises from competing loyalties and opportunities. This may include conflicts* between the nurse's value system and choices made by the patients, their families, other health care team members, the organization, or the insurance company, or when incentive systems

or other financial gains create conflict between professional integrity and self-interest.

Cost-benefit analysis: A strategy used in decision making regarding the advantages and disadvantages of financial situations.

Dilemma: Occurs when it appears there are no acceptable choices. To qualify as a dilemma, there must be active engagement in the situation that forces an evaluation of and need for choices. Actions are uncertain because alternatives are equally unattractive.

Ethics of care: Ethical principles applied to health care situations.

Failure to rescue: Effectiveness in rescuing a patient from a complication versus preventing a complication

Fidelity: The state of being faithful and loyal, referring to allegiance to another.

Fiduciary responsibility: An ethical obligation to good stewardship of both the patient's and the organization's funds.

Informed consent: Consent that has been granted, not assumed, following an educational process that facilitates the weighing of benefits, risks, and available options.

Justice: Conformity to principles of what is right and fair; establishment of rights following rules of equity.

Moral dilemma: Arises when two or more moral principles apply that support mutually inconsistent actions.

Moral distress: Occurs when someone wants to do the right thing but is limited by the constraints of the organization or society.

Moral principles: Those values, ethics, beliefs, and positions that guide behavior and thought.

Moral uncertainty: The confusion surrounding situations in which a person is uncertain what the moral problem is or which moral principles or values apply to it.

Nonmaleficence: Not committing harm or evil.

Paternalism: Using authority to regulate the behaviors of others; directing and controlling the behaviors of others because they either are not trusted to have good judgment or are believed to be incapable of making the best decision.

Patient rights: Rights to which patients are entitled; usually defined or described by the organization charged with providing care or protecting patients.

Quality of life: An individual's perception about the value and benefits of life.

Reciprocity: Referring to a mutual exchange of privileges, such as the ability to be true to one's self while respecting and supporting the values and views of another.

Sanctity of life: The belief that all life is of value and that this value is not based on how functional or effective a person's life is but rather that all have a right to life.

Values: Beliefs and attitudes that reflect a person's thoughts and culture.

Veracity: To tell the truth.American Nurses Association. (1994). *Position statement on assisted suicide.* Washington, DC: American Nurses Association.

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Appendix 14-1

Reflections on the Applications of Ethical Theory

Susan Barnes, RN, PhD

Application of Theory

Nurses make decisions constantly in regards to patient care and welfare. Nurses are obligated by the nature of the profession to act as advocate, liaison, intercessor, and spokesperson for patients and their families. The profession is bound in the role of the nurse to act ethically and morally, and to be loyal to the patient, to the physician, and to the system, which are sometimes at odds with each other. Many of the daily decisions in regards to patient interaction, while simple at first consideration, have an ethical component to them that can be quite complex.

Limitations to Application of Theory

Chapter 14 presented the definitions and basic approach used in modern bioethical decision making. With that foundation laid, it seems that a practical application approach might be immediately begun.

However, the application of ethical systems and definitions are seldom, if ever, exercised in a sterile environment, and when people are involved the environment gets messy quickly. Other factors inevitably impact the theories and definitions of the classroom. Although medical professionals have always dealt with questions of ethical content, the emergence of modern bioethics, mostly in the last 60 years as technology availability has dramatically mushroomed, gave rise to increasingly tangled ethical situations. This appendix should demonstrate the pragmatic side of various theoretical foundations in making decisions for the gerontological patient. This appendix will cover contextual frameworks and specific situations with the purpose of providing the opportunity to develop some elements of critical thinking required in making ethical decisions in patient care relationships.

It may be suggested that the definitions and systems of ethical thought are perhaps not the best, or even the first, place for a practitioner of the healing arts to begin deliberations. That approach makes the mistake of treating the patient as primarily a case of statistical probability, and betrays the Achilles heel of modern medicine, a largely unquestioned presupposition that sickness and disease can, and eventually will, be "solved," and good can be accomplished through the hope promised by empiricism alone (Hauerwas, 1990).

Yet this hope, taken to its logical extension, is really a source of despair when we see that every patient still dies sooner or later. Death is the place medical empiricism cannot go. So, approaching physical death as the end of everything means death must be defeated or, lacking that, delayed indefinitely at any cost. Death is the enemy that cannot be named, the "awful" that cannot be countenanced in any fashion, but attacked by any means at hand. The promise of expanding capabilities to manage and control the extremities of life is ultimately still limited by the great "enemy," physical death.

Such an approach to medical practice tends to depersonalize both the patient and those who provide health care. Although lip service may be given to the contrary, this approach largely ignores the context of the patient's existence—his or her community and meaningful interior values. Most nurses have experienced this depersonalization when a colleague, for example, refers to a patient as "the brain tumor in 308" or "the diabetic in 1634." It drives doctors to talk to patients and families about percentages of probable recovery following a certain course of treatment. It is also, in fact, a way to deal with the inevitable boundary of both the medical and the personal aspects of human existence and finiteness. Death is the ultimate boundary experience.

Contextual Considerations

Each patient encounter requires specific, thoughtful considerations by the nurse. These considerations can be thought of in contextual layers to help prioritize the implications. The contexts begin with the proper identification of the nurse in the patient's experience and extends to the patient's position in the health care system, and then to the very personal biopsychosocial individual themselves. The personal context of the patient will include not only implications brought about by the patient's age and health, but also by family and ethnic background.

The Context of the Nurse in Ethical Decision Making

The nurse first should consider his or her own role in a patient interaction. Is the role one of physical care provider, agency/system representative, family liaison, or case manager? In today's health care environment there may be any number of relationships between the professional nurse and the patient. So, the very first context that is of critical importance is determining the nurse's formal or professional role. This is not to say that we do not at times function in a realm beyond the formal role in order to meet patient needs; however, in order to make judgments about the appropriateness of different types of interactions, we must first consider the circumstance under which the nurse and patient are brought together. That circumstance defines the role, which in turn determines the direction of the rest of the patient's experience—and the initial response of the nurse often opens or closes the most important doors. At this initial encounter, the nurse can be faced with decisions that have ethical implications.

To clarify this with an example from clinical practice, the entrance into a palliative care program can be used. Strict guidelelines are in place that dictate which patients qualify for palliative or hospice care. These guidelines have to do with life expectancy based on diagnosis or diagnoses. Specific empirical indicators such as lab values or weight loss are used to qualify or rule out a patient from eligibility. Many would say that a somewhat utilitarian philosophical foundation was used in determining eligibility to try

to contain costs for Medicare and Medicaid or for insurance companies that usually pay for such services. It seems that with such well-defined boundaries, the hospice nurse only has to rotely follow the guidelines when assessing a new patient. But the expert nurse may consider a combination of factors in order to appropriately qualify a patient for service. In this contextual role, the nurse has the opportunity to exercise expert practice to provide the best service to the patient. To do less is to bar a patient from services that could provide a better quality of life in the dying experience.

It is appropriate to elaborate on the opportunity of the nurse to function outside of a defined contextual role yet within the boundaries of the profession. One must exercise caution because functioning outside a role can cause ethical and legal problems in terms of power abuse (restrictions of autonomy), inappropriate interpersonal (including sexual) relationships (lack of fidelity), or exploitation. In addition, if a nurse is transgressing institutional boundaries, he or she may be vulnerable to legal action. However, there are times when the nurse can bridge important gaps by going a step beyond the paid role while remaining within the boundaries of the profession to provide extra referral, counseling, or education in order to incorporate a holistic view of the patient and to improve the probable outcomes experienced by the patient. For instance, a nurse who is working for an agency providing home health care with a specific assignment for pulmonary management realizes that other basic issues are not met, such as payment of utilities and food supply. Although this person's role is not as a case manager, he or she may very well go outside the defined role to provide information and referral to obtain these other basic support systems.

The Context of the Health Care System for Ethical Decision Making

The next contextual layer to examine involves the system. Each system will have a framework that dictates ethical structure. It is important to recognize situations that demand working beyond a system's limits and bringing the patient into contact with other systems that can provide needed services.

While considering contexts, it seems opportune to point out that the philosophical approach of insurance companies (whether governmental or privately based) is at times in conflict with the natural ethical and professional values of the nurse and the patient's needs and desires. Insurance companies must contain costs in order to remain fiscally solvent. They maximize efficiency. This consideration is often secondary to the professional nurse who is personally motivated by a deontological perspective of each patient (that all human life has inherent value) and who is motivated to maximize quality of life. The desire to provide the opportunity for healing and to relieve suffering is a real and almost tangible element in the personhood of most nurses. The principle of justice seems to dictate the fair and equal access to health care, but, in reality, this may not exist. In some cases, those with private health insurance may have greater access to care than those dependent on public systems. However, as surprising as it may seem, sometimes the reverse may be true: those with public insurance may have broader services than those with private insurance; however, this situation occurs less frequently in the elderly because everyone over 65 currently has access to Medicare and Medicaid services.

The Context of the Patient

The context of the patient is the central and most important context to consider. Each individual has a belief system that includes a world view of morality and the practical application of ethical decision making. Each patient has a personal view regarding health and illness and the significance this plays in their own life experience. The vast majority of Americans express a religious belief that includes a continuation of the spiritual aspect of life after physical death. Suffering, although not talked about at length in current western society, is an issue of central importance in many individuals' religious experiences. Each individual has a personal view of the value of life in relationship to the quality of life. Each individual also has a unique relationship with his or her family. Assumptions should be avoided and appropriate assessment done for each patient and family to gain an accurate picture of the place in the family the individual holds. This will dictate how, when, where, and why decisions are made about medical interventions, types of care environments chosen, and the level of involvement desired of the professional nurse.

Throughout life we deal with potential and limitation. From the earliest attempts of an infant to roll over, to the concentrated determination of a child to catch a ball, learn to spell, and read, to the effort of developing professional skills and relationships as adults, every age struggles with capacities and boundaries. In adulthood, people begin to experience a qualitative difference in this tension. Whereas early in life they experienced the expansion of abilities and its promise of more to come, in mid-life they begin to encounter the stricture of increasing personal limitation. In the face of the present growing gerontological population, it may be especially apropos to examine this group's situation. Consider the following reflection:

> *I have always loved baseball and softball, and keenly enjoyed the challenge and pleasure of playing the game. When I was about 37 or 38, I went out to practice with the church league softball team and made a puzzling and unpleasant discovery. I ran as hard as I had always run, but couldn't generate any speed. I jumped as I always had, but barely got off the ground. I threw as hard as I always threw, but failed to make the long throws. I had hit one of the boundaries of life, the waning of biological strength. My hair began to turn gray. It became harder and harder to maintain fitness. I began to have small bodily ailments, aches and pains that necessitated more frequent visits to the doctor than before.*
>
> *I no longer show up for church league softball; I can't make the team as a starter anymore, and my ego can't abide being a lowly "sub." So I have to settle for the realization that a cascading narrowing of physical possibilities has begun to affect me in ways that, in many aspects, tend to be uncomfortable. My small experience, trivial as it is, is not unique to me—its principle is universal, though individual instance may vary slightly. The implications of the logical extension of this progress is to imagine one's own death, though it can only be viewed through a filter of distance and denial.*

In his book, *Crisis of Modern Life*, Gerkin (1979) notes the process so aptly described in the previous reflection as a universal human experience, and calls it "anguish."

> *In my search for a word that points to this universal and primary boundary experience of*

> *death, the word that seems most apposite . . . is the word "anguish." In its common usage, of course, anguish refers to acute pain, suffering, or distress. In its Latin rootage, {it} carries a connotation of a narrowing, strangling experience that has about it a certain angry torment. To experience anguish is to experience that excruciating distress of having life's boundaries pressed together about the self. One's very life is being squeezed out, tightened down. No angry wrenching loose will avail; the strength of life is dwindling, and all that remains is that helpless and angry torment—the anguish of death. (p. 75)*

He goes on to say:

> *The process of narrowing has begun, inexorably and unrelentingly moving the life cycle of the individual toward old age and death. Instead of building up, life beings to contract. The concept of self must now be adjusted to the narrowing realistic possibilities. Eventually withdrawal from one activity after another becomes inevitable; life must be simplified. (p. 79)*

Sooner or later, the aging person has to face the question, "How do I want to die?" The question speaks to more than just the mode of going—"without pain," "suddenly," "without causing trouble to those near and dear to me." It speaks to appraisal, an evaluation of one's life as it has been lived in the light of ultimate meaning associated with a person's community and God, however one conceives Him. Erik Erikson called this stage in his developmental theory *integrity versus despair*. In this time of life, a person decides if his or her life has been worth the trip. Such evaluation determines whether the person is prepared to or can get prepared to die what some call "a good death."

In addition, there is related change that takes place in human development in viewing what constitutes a high quality of life. Many young people consider the essence of life to include their abilities to participate in physical activities—to participate in competitive or recreational sports, to enjoy social activities that are active in nature, to travel, or to work in certain professional roles. Because of the developmental stage of young adulthood, it is not always easy to imagine the perspective of an older person who has lost some of the abilities to participate in an outwardly active life, to run a business, to deal with multitasking, and so on. But older individuals find intense meaning in their life and report high satisfaction despite changes in health, activity level, and functional status. It is appropriate for the younger individual to keep an open mind about what makes up the core values of the older person's world.

Crisis arises out of some change in a person's life situation that transforms his or her relationship with others and/or his or her perceptions about himself or herself. Such transformations may occur in two ways: 1) gradually, the result of common, universal social or physical experiences, or 2) suddenly, brought on by some traumatic unforeseen event.

There is a sense that a person never faces a crisis alone. This person is helped or hindered by the significant others (including God) of his or her life and experience who have impacted, taught, and transformed him or her in many different ways—through personal relationships, modeling, or creeds—to see what meaning/purpose there may be in the universe. The past informs the content of our present and in large part predicts our future. In any case, community and personal experience shape and develop spiritually a perception of ultimate purpose/meaning.

As one sees bodily capabilities deteriorate and one's professional options and commonly held parental functions disappear, these crises between potential and boundary necessitate a well-developed ethics. Medical crises are a part of, and informed by, the whole context of the patient's experience and the meaning he or she derives from it. Crises are the places in which medical personnel must make the decisions that constitute bioethics.

The context of the patient and the practical importance of this context are readily demonstrated by the concept of advance directives. Each individual who has accessed health care has had the opportunity to fill out advance directives and express a preference for life-prolonging measures in the face of terminal illness. Many Americans, expressing the underlying societal value of rugged individualism, state that when confronted with a terminal irreversible health challenge, they wish to allow nature to take its course without the interference of aggressive medical intervention. This is important because the individual has expressed autonomy in outlining his or her preferences, and the role of the nurse is to act as the patient liaison when confronted with circumstances where the advance directive is called into play. However, because a patient states in an advanced directive that he or she does not want life-sustaining treatment at the end of life does *not* mean not to treat acute illness or to treat with comfort measures. Research has demonstrated that health care workers in nursing homes have often interpreted the presence of an advance directive to mean that the individual does not want to be treated with anything, including appropriate access to nutrition and hydration and treatment for simple things such as pain and infection. This superficial understanding of advance directives is rife with more than ethical consequences—it is likely to lead to increased suffering and shorten the patient's natural life span.

If a patient in an assisted living facility, for example, has filled out an advance directive relating specifically that no artificial hydration and nutrition is to be administered if she experiences a terminal illness that renders her incapable of expressing her desire, and that individual experiences a urinary tract infection, treatment of that acute illness is appropriate. Not treating it would be unethical.

Critical Thinking Questions:

What are your thoughts about the comments above? Have you ever been in a situation where a decision made you uncomfortable? How did you deal with it?

Vulnerable Populations

The implication of an individual being classified as vulnerable has much to do with that person's abilities and his or her maintenance of autonomy. Autonomy refers to what makes actions or opinions one's own. Autonomy is the ability of persons to determine their own direction and outcomes (Beauchamp & Childress, 2001). A vulnerable person is someone at high risk for loss of autonomy, and who requires protection from that loss and all associated repercussions. The nurse is often the professional person acting on behalf of the vulnerable individual. Beauchamp and Childress discuss the contrasting view of autonomy to be heteronomy, which refers to control over the person without a moral imperative as a guide. This situation would exist when a person acts out of emotion, pain, or fear rather

than from reason. The concept of heteronomy adds significant depth to understanding autonomy. The discussion of autonomy in various patient populations is extended due to motivations that one might have originally considered as autonomous (the desire for more pain medication than is physically tolerable, the desire for death by starvation, etc.) but are not recategorized as actions taken in an altered emotional state versus a rational state of mind.

All of us at one time or another have been in the category of being vulnerable. As children, we were not able to function autonomously, provide basic needs for ourselves, or make decisions having long-term consequences. Most elders are no more vulnerable than any general member of the population may be; however, there is a significant subcategory of elders who are vulnerable for varying reasons, including a decline in sensory perception, a decline in communication skills, a decline in mobility, or a decline in cognition. Somehow the individual has lost power and consequently autonomy. When such a situation exists, the nurse is responsible for acting on behalf of the patient with a primary emphasis on maintaining autonomy of the patient. An example of this situation may be for someone who is in a long-term care facility (assisted living, a group home, or a nursing home) who does not have the ability to communicate due to some change in brain function such as a stroke or other organic process that affects the verbal communication center of the brain. The medication aide may have inadequate training on evaluation of pain and wait for the person to verbally express pain prior to receiving pain medication. However, someone who has a degree of aphasia may not be able to spontaneously say the "key" word(s) yet is expressing the presence of pain in any number of other ways that go unrecognized by the paraprofessional. The resident may be expressing agitation, confusion, altered sleep patterns, a change in eating habits, or increased or decreased movement related to pain, and yet be undermedicated for pain. The resident has chosen a living environment where he or she has voluntarily given up autonomy of self-medication, including pain medication. The individual, if acting autonomously, would prefer to have medication for pain relief. Yet this person cannot access the pain medications or communicate with the entry-level person in charge of medication administration. Withholding of pain medication is now considered to be a legal issue.

Critical Thinking Questions:

What patients or residents have you cared for who seemed to be vulnerable? What are some ways you have observed geriatric nurses uphold a person's autonomy? Can you think of some ways that you would uphold a person's autonomy who is considered "vulnerable"?

Application of Ethics in Decision Making for Dementia Patients

Even more clear-cut examples of the usefulness of ethical theory are seen in another very vulnerable group of individuals, those with dementia. Because of the changes in cognitive abilities of these adults (many of whom have lived responsible, productive, independent lives), their role in society and in their family has changed drastically. Individuals with dementia

are considered by some to be less valuable members of society. Some believe this is shown in the lack of recognition dementia receives as an illness requiring specialized care in long-term care facilities or even in palliative care programs. When little resource allocation is given to a condition, it can be interpreted to mean that the situation is not significant. This can be considered a type of prejudice against those who have lost the promise of productive contribution to society as far as monetary or societal service goes. Custodial care may include the bare minimum of interventions and environmental structure; however, application of a deontological or Kantian view of human existence will support the idea that there is an inherent value to human life. Many caregivers of those with dementia who have experiential knowledge of the personhood of those with dementia will confirm the inherent value of life in those with altered cognitive function. Using quality of life and cost effectiveness as the two extreme debate positions, the level and type of care, whether community-based or long-term care, provided for those with dementia can be argued using various ethical viewpoints.

Patients with dementia not only are dependent on others to champion the cause of their daily care, but also are dependent on others to make decisions regarding medical interventions. If surgery is indicated for an acute illness such as a bowel obstruction, the individual is not capable of signing informed consent for the procedure. Each state has legal guidelines discussing who is to make these types of decisions. The spouse is the first person considered as the designated decision maker. In the event the spouse is unavailable or incapable of making proxy decisions, the task can be delegated to siblings or children, grandchildren, other relatives, or a court-appointed guardian.

Participation in research is another area that should be considered in terms of elders. On one hand, it is possible that elders are left out of research because of ageism. But this opinion needs to balanced with the idea that many elders are vulnerable in different ways to various threats, whether in regards to physical resilience or the ability to give informed consent.

Critical Thinking Questions:

How are persons with dementia more at risk for being taken advantage of? How should nurses protect persons who are not able to make decisions for themselves? What teaching about the rights of older adults, even those with dementia, needs to be done with nurses? Other staff members? Family members?

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Section 8

Human Diversity (Competency 20)

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Chapter 15

Appreciating Diversity and Enhancing Intimacy

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LEARNING OBJECTIVES

At the end of this chapter, the reader will be able to:

1. Describe the diversity of older adults.
2. Identify strategies to enhance the care of a diverse elder population.
3. Implement strategies to prevent and overcome racism in patients and the health care team.
4. Describe the sexual development of older adults and changes in the sexual response due to aging and chronic illness.
5. Identify strategies to overcome vaginal dryness and erectile dysfunction.
6. Implement appropriate policies that promote intimacy in community and long-term care settings.
7. Discuss strategies to extinguish sexually inappropriate behavior.

KEY TERMS

- Diversity
- Dyspareunia
- Erectile dysfunction (ED)
- Human sexual response
- Racism
- Religion
- Sexuality
- Spirituality

This chapter addresses diversity issues in providing holistic nursing care for older adults. Sexual expression and romantic intimacy are viewed as a part of holistic care and are a major part of this chapter.

Diversity and Holistic Nursing Care

Diversity of Elders

Adults over 65 years old are much more diverse than any other age group, because of the wide range of their life experiences, lifestyles, and health status, and variation in their socioeconomic status. Although the majority of elders in the United States are presently white and female, this is changing. The rise in the number of elders of color, and differences in diets, leisure, and health care beliefs will present a tremendous challenge to nurses. Food is one example of this challenge. What people eat differs widely: Some elders have tried many different foods throughout their lives, whereas others have limited their diets to a few foods, even though great variety may be readily available. To illustrate, some elders have eaten pork their whole lives, others have avoided it for religious reasons, and still others have avoided pork products believing they are too high in fat. Elders are not alone in these behaviors. The author recently conducted a **diversity** exercise with nurses. They were given a list of 20 foods from the menus of restaurants within a one-mile radius of their hospital, but only a few had eaten more than 5 to 10 items on the list.

Providing food that is consistent with cultural, ethnic, religious, and personal preferences in hospitals and long-term care settings is a tremendous challenge. ElGindy (2004) suggests that patients who are in a hospital or nursing home may need to check out, even against medical advice, if the facility is unable to meet their dietary needs. ElGindy makes the following recommendations for dietary cultural assessments. Remember that each individual is unique, and that adherence to dietary traditions and guidelines varies. Personal food habits are more a part of cultural norms, but the nurse can recommend subtle changes that can have a profound effect on health. For example, switching from regular soy sauce to a low sodium brand is culturally sensitive but cuts salt intake by half. The nurse may need to use pictures of foods to get a clear idea of what a patient likes to eat. To determine how flexible the individual may be in making dietary changes, ask if the patient's special dietary need is a cultural norm, a personal preference, or a religious mandate. The wording a nurse uses may help. For example, Seventh-Day Adventists believe that eating between meals is an undesirable habit; thus, diabetics can be taught to divide their intake among five or six small meals, rather than told to include a snack. Finally, encouraging patients to perform special customs or religious practices before or after meals may increase their likelihood of adhering to treatment related to dietary restrictions. A key strategy for achieving cultural competence is to learn about different cultural and religious preferences, customs, and restrictions, and then use this knowledge in planning and providing care.

Economic diversity is also great: Some elders are barely getting by whereas others are among the wealthiest in society. Ensuring all have adequate food, shelter, and health care has always been a societal problem. The effects of age also differ. Some 60 year olds who have lived with chronic illness may be frail and disabled, although the majority of persons at this age are

active, productive, and independent. Many 80 year olds are frail, yet a few are active, productive, and independent. The key for nurses is to assess each individual's level of activity and health status and plan care accordingly, rather than relying on age alone as a factor in planning care.

Another aspect of diversity is **religion** and faith practices. Again, the elderly are a very diverse group. Some have practiced only one faith their entire lives, whereas others may have made many changes in a lifelong spiritual quest. Faith communities provide a great deal of support for some elderly. Faith communities are active in promoting health for elders and in overcoming health disparities.

Health care for elders is also diverse. Those who are wealthy, well educated, and used to having power have tremendous advantages, allowing them to receive the best care. Those who are poor, poorly educated, and used to living on the margins of society suffer from health disparities.

Health Care Disparities

One of the goals of the Healthy People 2010 project is to eliminate race- and ethnicity-based health disparities. Poverty for African American women older than 75 years and living alone remains at a rate that is 10 times that of white men between the ages of 65 and 74 years (Takamura, 2002). The challenge for nurses is to continue developing reliable, evidence-based, culturally competent nursing interventions for minority elders. The differences between healthy aging and aging impeded by the clinical manifestations of chronic illnesses and disability are largely due to the adoption of health promotion behaviors and the ability to obtain appropriate medications and treatments. Assisting elders to make healthy decisions and adhere to medication and treatment regimens is addressed elsewhere in this text; however, the challenge remains that we must adapt our independent nursing interventions to make them appropriate for elders of different races and ethnic groups.

Kathleen Fuller, PhD, the director of AnthroHealth (www.AnthroHealth.net) (2002), recommends reframing the problem of health disparities from a racial issue to one of a phenotype/environmental mismatch that cuts across current racial groups. Fuller points out that cultural behaviors and biological variations are rarely based on race, and there really are no biological races. Census data from 2000 confirm this: 7 million people checked more than one box for race. Focusing on racial disparities ignores the diversity among racial groups and leads us away from the true issue: the higher incidence of diseases in certain individuals. One example Fuller cites is the high incidence of hypertension in people of color in the United States. Fuller points to research suggesting that a significant factor contributing to hypertension is low serum vitamin D levels. Those who have darker pigmented skin, regardless of racial background, need more exposure to ultraviolet B (UVB) radiation than those with lighter skin pigment in order to activate vitamin D. Thus, people of color in the United States may need more exposure to UVB radiation or prophylactic doses of vitamin D in order to reduce hypertension and the disparity in the incidence of myocardial infarctions (MIs) in patients of color. Fuller recommends determining the degree of pigmentation in all patients using a Minolta 508d spectrophotometer, which is noninvasive and takes about 3 seconds, rather than asking about racial designation on health care forms. Appropriate treatment would be based on an individual's skin color, the latitude in which the person lives, the person's current serum vitamin

D level, and his or her risk for disease. Fuller also makes convincing arguments for reframing the health disparities of prostate cancer, low-birth-weight (LBW) infants, infant mortality, rickets, and melanoma as interactions of degree of skin pigmentation, amount of exposure to UVB radiation, and levels of serum vitamin D.

Past and Future of Diversity and Aging: Implications for Nursing

A 2002 issue of *Generations* contained an interview with E. Percil Stanford and Fernando Torres-Gil, two leaders in the field of aging who have long focused on diversity. This interview (Kaufman, 2002) contains several points crucial to consider when caring for the diverse population of older adults. The first is that diversity has been mainstream for over a decade in the field of aging, and elders with diverse points of view have long been in leadership positions in the American Society on Aging, the Gerontological Society of America, and the American Association of Retired Persons (AARP). Some minority elders who were overlooked now have a well-heard voice. The lesson for nurses here is that to ensure culturally competent care, elders who are being cared for need to have a voice in their care and regularly give input into how care is delivered, for themselves and their loved ones.

The second point is the need to use well elders as volunteers and as paid staff when providing care and to ensure that they have educational and training opportunities, as well as the support to remain active members of their communities and their health care organizations within their communities. Virtually all elders will eventually require some level of assistance or health care. Helping them stay healthy as long as possible and then helping them plan for their own care is key to the financial survival of our health care system. We have a long way to go in helping elders make sound health care decisions early on, before a crisis occurs, and to ensure that all family members are in agreement with the decision.

A third point is the need to seek out individuals who are not being served, who are still marginalized, and who lack resources, in order to focus care on those who really need it (**Case Study 15-1**). Not all elders need all resources; the focus needs to be on those who are in the greatest need.

Providing Care for Those Who Believe the Future is Bleak

In every new cohort of elders, some proclaim that "the world is going to pot." The statement reveals both how much our society changes with each generation and how those who make this comment perceive that the changes have worsened the quality of our lives rather than improving it. Statements may even become personal attacks on those who are younger: "You are contributing to the problem." It is difficult not to take the attacks personally; younger family or friends who get tired of hearing the comments may distance themselves from those who hold these views. Similarly, nursing staff may find themselves staying away from elders who constantly voice criticism. Elders are not alone in their view of change. In every generation, some fight to hold on to an older way of life. Examining why elders feel this way can assist those who are younger to provide compassionate care. "The world is going to pot" statement suggests that elders feel a lack of respect for their past way of life, and for the knowledge and wisdom they have gained in six

Case Study 15-1

A nurse is in charge of an intercity clinic that serves the uninsured, underinsured, and the "working poor" in a location where the majority of older persons are from minority groups. Getting medications prescribed by the clinic's doctor for those who cannot even afford to put food on their tables is a constant challenge that the nurse wishes to address.

Questions:

1. What resources are available at the local, county, state, and federal levels for such a clinic?
2. How would the nurse begin finding funding sources to help those at the clinic?
3. What is the role of drug representatives and drug companies in clinics such as these regarding providing samples of or free medications?
4. To whom could the nurse go for assistance in addressing the issues in this community?
5. What would the nurse likely see as typical medical problems among this group of older adults?

to eight decades. Fear and anxiety about being able to cope with and prosper in the future may also be a contributing factor. Listening and confirming one's respect for the elder's point of view are two effective nursing interventions. Acknowledging that change is difficult to accept and keep up with may diminish the negative comments, and assisting an elder to focus on the positive aspects of what he or she sees rather than the negative may also be effective. An 85-year-old woman told the author that she uses this strategy regularly with those she knows who see the world as "going to pot," and the strategy appears to work. If these strategies are unsuccessful, those who become negatively fixated on the past may need professional evaluation for depression.

Diversity in the Health Care Team

Traditionally, nurses have been primarily white and female; however, the diversity of health care teams who care for elders is increasing dramatically, especially in race and ethnicity. The changes will have a profound impact on elder care. In order to ensure quality of care, we must promote diversity while preventing stereotyping, become culturally competent, cope with and overcome **racism**, overcome language barriers, and learn effective health promotion strategies for those with varying lifestyles. In 1998, the American Nurses Association (ANA) published a position statement on Discrimination and Racism in Health Care, which is available at

www.nursingworld.org. Diversity education for nursing staff should be included as a part of routine educational programs within facilities. To ensure that the strategies learned are put into practice, the offerings need to be embedded in the care environment where patients and staff interact (Chevannes, 2002).

Grossman and Taylor (1995) have outlined numerous ways for nursing staff to promote both morale and quality care when working with a diverse staff. They point out that opportunities are created for staff to draw on a wide range of individual strengths. Unfortunately, prejudice, poor teamwork, increased conflict, and a reduction in job satisfaction may also occur. Two key issues to keep in mind, especially when working with those who speak English as a second language, is to be sure yes really means yes, and to recognize and ensure that communication is still occurring when someone uses a nonconfrontational communication style. When people whose English is poor are asked whether they understand or whether they will do something, they may say "yes" even though they really mean "no," because they want to be polite, or not offend, or not call attention to themselves. They may use nonconfrontational communication, believing it is better to say yes, and go along, than to be confrontational. Staff working together can ask each other to repeat what is expected or being taught, and ensure that additional, nonthreatening opportunities are made available to raise concerns or objections at a later time.

Covert Racism in the Health Care Team

The ANA's statement on discrimination and racism notes that, "discrimination and racism continue to be a part of the fabric and tradition of American society and have adversely affected minority populations, the health care system in general, and the profession of nursing" (ANA, 1998). Although more covert than in earlier decades, racism still occurs in health care settings, resulting in health care disparities for minority patients and a difficult working environment for minority health care staff (Box 15-1). Adopting policies to prevent racism will diminish the overt expression of racist comments and actions among staff, but it does not address the underlying need to appreciate and increase diversity in the health care team. In the author's view, policies alone will not prevent or overcome racism, and even in those trying to become more aware, racist attitudes emerge.

The journal *Minority Nurse* regularly addresses the subject of racism among staff. In a

Box 15-1 Consider This

Minority nurses may feel unaccepted and unappreciated.

Minority nurses may feel unrecognized, think that both staff and patients see them as nursing assistants, and feel that they have to do twice as much work to seem as good as their white counterparts. They may even feel others don't think they are there.

Repeated exposure to racist comments and prejudicial behavior results in negative self-esteem and may produce anger and bitterness towards the offender.

Source: Grossman & Taylor, 1995.

recent article, Carol (2005) recommended that when a coworker makes a culturally insensitive remark and a heated exchange takes place, managers need to be informed. Later, when those involved have cooled down, the situation can be discussed with the manager present. A sincere apology may be all that is needed, and this may prevent further insensitive behaviors. If culturally insensitive remarks continue, counseling needs to occur.

Nursing staff working on a diverse team need to regularly explore how to maximize each other's strengths. One-on-one efforts may be the only way we can prevent or overcome covert racism and stereotyping and become culturally competent.

Racist Comments from Patients

Little is mentioned in the literature about elderly patients who make racist comments towards staff from different ethnic groups. Some patients appear to lose their inhibitions as they age, and those with dementia may be especially prone to making racist comments. Redirecting patients and telling them that the comments are inappropriate may be helpful in modifying the behavior. One group of personal care aides used the strategy of "giving themselves a time out," and coming back later to provide care. Minority nurses who have "been there" also suggest trying to understand the patient's intent. Racist remarks may occur because the patient is confused, frustrated, feeling vulnerable, and is unable to think of anything else to say (Carol, 2005). Effective strategies for preventing racist comments have not been tested through research, and the problems are rarely mentioned in the literature, nor are they brought up by staff. The first step for a staff member who experiences a racist comment is to report the comment to the nurse manager, who can later discuss the inappropriateness of the comments with the patient (Carol). Just as effective strategies have been identified to reduce residents' behavioral manifestations of dementia including fighting and resisting taking a bath, strategies can be developed to extinguish racist comments. Research also needs to examine the long-term effects on staff of having to put up with racist comments. A recent article by a nurse in England advocated that patients who make racist comments and who do not require emergency care be denied care (Duffin, 2004).

Invisible Groups/Unheard Voices

Although we are a diverse society and elders are a diverse group, some groups of elders and some groups who care for elders may be invisible and unheard (Rasin & Kautz, 2005). For example, elders with dementia who are cared for in the community are unable to express their needs. Those who care for them, especially in family care homes, are also invisible and unheard. Family care homes are small assisted living facilities, often limited to six beds or less. Even though the quality of personal care may be excellent in these homes, the invisibility impacts patients' health because nurses may not be involved in their care, and the patients may have unmet or unrecognized health care needs. Nurses may not listen to caregivers when the demented elder comes in for care, and thus changes in the elder's health and behavior may not be noticed. Nursing students who have clinical experiences in community settings may be more likely to recognize the expertise of the caregivers and also recognize them as a community resource when planning for community care. Nurses need to be

educated about family care homes and other community facilities that provide care to disabled elders, and ensure quality discharge planning and teaching are implemented prior to transfer back to a family care home or other community facility.

Providing Culturally Competent Care for Culturally Diverse Patients

Walsh (2004) has developed a plan of care, based on North American Nursing Diagnosis Association (NANDA) nursing diagnoses, to provide culturally competent care. The care plan focuses on communication, health maintenance and health education, nutrition, and family coping. Strategies are briefly summarized in this section and supplemented with additional ideas.

If a client speaks a foreign language, or is unable to speak, assess the need for and provide an interpreter, and use resources that are printed in the patient and family's dominant language, to ensure that the patient and family will be able to communicate needs and understand instructions. Use alternative communication methods, such as sign language and printed pictures of basic needs. Additionally, have one or two laminated page sets of common questions and appropriate responses in both English and the patient's dominant language that nursing staff and patients can refer to. Hand-held English and foreign language dictionaries that actually speak the words may be helpful. Language classes could be a requirement both in nursing schools and in practice settings for all staff. Higginbotham (2003) has written an excellent paper outlining the ethical and legal recommendations in overcoming a language barrier.

Health maintenance and health education efforts by staff may be hindered by cultural patterns of dominant and minority populations, especially efforts to change dietary habits. For example, the practice of encouraging children of all cultures to "eat everything on the plate" certainly has contributed to obesity in Americans. Nursing staff can assess for unhealthy patterns and religious or cultural beliefs that may support unhealthy patterns, then assist patients to adopt new behaviors that are consistent with their cultural and religious beliefs. For example, encourage clients to substitute traditional foods that may be high in calories and fat for other foods that are also traditional but lower in fat. A traditional food of Southern whites and blacks is "greens," which are cooked in bacon grease or pork fat-back. Greens include collard greens, mustard greens, and kale. Substituting a low-salt chicken broth and a few pieces of low-fat meat will create a similar flavor and significantly cut the calories, fat, and salt. Greens are a great source of both vitamins and antioxidants, and cooked in this manner they are a healthy dietary choice.

Family coping may be compromised in any health care setting if the family feels a lack of privacy, feels that the staff does not respect their spiritual beliefs, or feels unwelcome. Nurses can assess the effects of a patient's illness on the family and encourage families to participate in care. Religious and cultural requests should be honored whenever possible (**Figure 15-1**). By being sensitive to a family's typical patterns and providing support, as well as referring the family to appropriate support services, the nurse can aid the family in providing care to the patient while in the hospital or long-term care setting, and in caring for the patient at home after discharge (**Box 15-2**).

Figure 15-1 Nurses should be sensitive to ethnic and cultural differences among families.

Source: © Photodisc

Providing Spiritually Competent Care for Spiritually Diverse Patients

Similar to providing culturally competent care is the issue of providing spiritually competent care. Certainly **spirituality** is an important and essential component of culture, but bears special mention here. *Religion* and *spirituality* are commonly used terms, but should be distinguished from each other. Religion is the organized worship or specific faith to which a person subscribes, whereas spirituality is a broader term referring to one's feelings of being connected

Box 15-2 Research Highlight

Aim: To study the relationship between older Latinos, their pets, and health.

Methods: Twenty-four persons over age 50 (average age of 60 years) and of Latino background participated in the study. Relationships with their pets and health, their exercise patterns, and demographics were examined.

Findings: The participants largely felt that their pets were an important social support, much like a family member. The sample rated their health as good to excellent, despite being a member of a minority group with more reported health problems than other ethnic groups. Most subjects had been involved with animals since childhood. Pets seemed to play an important role in the health ratings of older Latinos.

Conclusion: Nurses should recognize that pets may be a significant source of positive social support for some older adults. This study suggests that among older Latinos, the family pet, especially dogs, may be a health-promoting factor.

Source: Johnson, R. A., & Meadows, R. L. (2002). Older Latinos, pets, and health. *Western Journal of Nursing Research, 24*(6), 609–620.

with something higher than oneself, often without wishing to be called "religious."

For many older adults, religious observances and practices are an important part of their lives and family. Schmidt (2004) summarized nursing research findings related to spirituality and health in *Spiritual Care and Nursing Practice*. Her analysis suggested several interesting factors related to current research on spirituality and older adults. First, "spirituality is related to a sense of well-being in older adults" (p. 308). Many older adults believe that faith in God, prayer, and trust in a higher power assists them to cope with life's difficulties (Easton, Rawl, Zemen, Kwiatkowski, & Burczyk, 1995). Second, a positive relationship exists between emotional well-being and self-transcendence (Schmidt, 2004). In addition, older adults who report regular church attendance also reported less depression and better feelings of health than those who did not affiliate with organized religion (Easton & Andrews, 1999).

Nurses are responsible for finding out needed information about each patient's spiritual practices and preferences as part of a holistic plan of care. The person and family members may be an excellent source of information. Older persons should always be asked if they wish their spiritual leader or adviser to be included in the interdisciplinary team or notified of hospitalization. Local churches, parishes, or synagogues can be helpful in locating resources and spiritual support for those with spiritual beliefs different from the nurse's own. Books and Web sites can provide additional insights, although the older person, if able, will be the most accurate source of insight into what is needed to provide competent spiritual care (see Critical Thinking Exercises at the end of this chapter). Spiritual care takes on particular significance at the end of life and is discussed further in Chapter 22.

Taking Lifestyle into Account When Promoting Health

A final piece of providing care to diverse groups is promoting health with lifestyles that are very diverse. (The topic of health promotion is addressed in detail in other chapters.) Considering the diversity of lifestyles is key in planning care. Some older adults have always exercised and will continue to do so if they can find a way to continue despite the effects of aging and changes due to chronic illness. For example, those who have always been active but now have severe arthritis pain or mobility limitations may attend a water aerobics class if the class is reasonably priced, given at a convenient time, and transportation is provided. Chair aerobics may be another option. However, motivating someone who has never or only sporadically exercised will require intensive efforts, possibly on a daily basis for many weeks, with continued monitoring and motivating for months until the change becomes a habit and the elder can see a real difference in how he or she feels. Patient adherence to medications and diet in order to prevent or slow down the complications of chronic illnesses is well documented as a major problem. The key is for nursing staff to individualize the plan of care, then periodically check to be sure the plan is working and make adjustments as needed. Continued support, either by other elders making the same change or by health care workers, may be necessary until the changes become established in the elder's routine.

Enhancing Sexual Intimacy

A basic human need of people of all ages is intimacy with others. Loneliness, loss, and lack of meaningful social relationships have been addressed in other chapters in this text. This section is designed to assist the nurse in enhancing romantic intimacy and sexual function in older adults. Those over 50 are a very diverse group, and when it comes to romantic intimacy and sexual expression, they are probably more diverse than any other age group.

Romantic intimacy and sexual needs of older adults are often ignored by health care professionals for several reasons. Sex is not seen as a priority by either the patient or the provider, and sexual concerns have not traditionally been addressed in health care encounters. As nurses, we do not see the consequences of not addressing sexual concerns. **Sexuality** is seen as separate from health care concerns, rather than integral to quality of life. Anxiety and fear of embarrassment prevent patients and nurses from bringing up sexual concerns. Further, we fear that we may not have the resources to assist patients to overcome sexual problems.

Most sexual concerns that result from aging or chronic health problems are within the realm of nursing practice. Yet instead of helping, we may contribute to sexual dysfunction by ignoring the underlying health problems that lead to sexual problems. For example, urge or stress incontinence in women may lead to vaginal infections and **dyspareunia** or painful intercourse; in addition, the woman or her partner may be turned off by the smell. Yet hospital nurses rarely ask about this type of incontinence when a patient is admitted. Acute respiratory infections, abdominal surgery, and mobility limitations following surgery may all lead to temporary urge or stress incontinence, but nurses do not routinely warn patients about this possibility nor treat or refer those with problems. Sending a patient home with an indwelling foley catheter will certainly interfere with sexual intercourse. Teaching a woman to tape the catheter up on her abdomen and wear some type of t-shirt to prevent the catheter from rubbing during intercourse, or to wear a crotchless teddy or crotchless panties will keep the catheter out of the way. A male with a foley catheter can fold the catheter back over an erect penis, and then put on a condom. Partners report not being able to feel the catheter during intercourse, and ejaculation will occur unimpeded around the catheter. Both of these techniques have been recommended for decades and they are not thought to increase the chances of urinary tract infection. Yet again, nurses regularly fail to teach clients who are discharged with catheters these effective and safe techniques.

We also miss many opportunities to assist our clients in overcoming problems. Most health promotion strategies have the potential for a positive impact on sexual relationships and sexual function. Quitting smoking, limiting fat in the diet, losing weight, and exercise all may reverse the sexual changes that occur due to aging. If our patients realized that heightened intimacy and regained sexual function may result from these lifestyle changes, they may be more motivated to make the changes.

Romantic Relationships in the Elderly

Census data collected in 1998 indicate that the great majority of older adults have been married

at one point (Huyck, 2001), and like adults of all ages, many elders continue in romantic relationships. However, elders differ greatly in their romantic relationships. Some older adults have been in the same romantic relationship for 50 years and have developed a profoundly deep relationship. **Box 15-3** introduces Tim, an 81-old-man, and Teresa, a 79-year-old woman, who discussed how they feel about their 50-year relationship.

Box 15-3 Tim and Teresa's Reflections on Intimacy

Tim

"I think she feels about me just about the same way I feel about her. I'm sure I come first in her life and I'm sure she's first in my life. It's always been that way. She was the girl that I wanted. I got her and I still want her. Both of us try to please each other. One of the most important things in a marriage is a connection. If you do (have a connection), show your relationship in love and with expressions of love. We say it every day, two or three times. I love you."

Teresa

"I couldn't live without him. I like to know where he is every minute. I like to touch him, I like him by me in bed. I like him. I just like him. Tim married for keeps and so did I. We're always together, and most of the time either holding hands or he has his arm around me or I have my hand on his knee. And there's not just one—it's not just Teresa, and it's not just Tim, it's Teresa and Tim."

Source: Kautz, 1995, p. 55.

Some people become involved in a romantic relationship for the first time after retiring. Some have been married many times, others not at all. Some have had literally hundreds of partners over their lifetime, others only a few, others one, and still others none. Some were nuns and priests or celibate for other reasons, and then gave up being celibate in order to be in a romantic relationship. Others became nuns or priests or otherwise became celibate after being married when younger. May–September relationships also occur, and an elder may have a partner who is 30 or even 40 years younger. Some elders have been gay or straight their whole lives; others are bisexual and have been in gay or lesbian relationships when younger, then later become married and have children. The opposite is true as well. The 2004 movie *DeLovely* about Cole Porter realistically portrayed his homosexual relationships as well as his long-lasting heterosexual marriage.

Gender identity may be an issue that a man or woman struggles with all his or her life, and then acts on the desire to be the opposite gender when older. A poignant example is of a man who had transsexual surgery at 74 (Docter, 1985). When asked why he had not pursued the change earlier, he said that he was married to the love of his life for decades, and if she had known that he wanted to be a woman, it would have crushed her. Several years after her death, he had the surgery and lived out his last 3 years as a woman. As a society, we continually try to come to terms with the diversity of romantic relationships. As nurses, remaining nonjudgmental will ensure that our care includes and is respectful of those who are most important to our patients, regardless of whether we believe their romantic relationships to be

healthy or morally or politically correct. Indeed, excluding the love or loves of a patient's life when the person is ill or dying may potentiate complications or hasten death. Including the love may speed recovery. We need to ask, "Who should I call?" rather than asking about marital status. Unfortunately, those who are most important to our patients may stay away out of fear or unease when their partner is admitted to a health care facility. Nurses have a unique opportunity to be welcoming to those our patients love. Some believe that God is love, and it may be that if we help our patients to love, we will bring our patients and ourselves closer to God.

The loss of one's romantic partner through divorce or death is common for older adults; however, the sexual loss is overlooked by most of society. Research on grieving completely ignores how people who lose a lifelong romantic partner adjust to the loss of sex, and what we as health professionals can do to assist them in coping with and overcoming their loss. Of course, not all experience grief, as the last years of a long-term relationship may have been sexless and filled with anger and pain. Nevertheless, nurses need to assess for the loss of intimacy and sex, acknowledge the losses, and listen to our patients as they express grief and anger.

Sexual Development in Older Adults

Contrary to what some think, adults who engage in sexual activities continue to develop sexually throughout their lives. Chronic illnesses have the potential to affect sexual function, and those who are older who continue to have sex have to adapt to many changes. The current cohort of adults who are over 85 years old were generally raised not to talk about sex, and may not talk with their partners about their sexual desires or preferences. They may see this silence as a way of protecting their partner, even though the silence results in loss of intimacy. Those in the old-old age group have lived through several sexual revolutions. The first revolution was in the roaring twenties. Women gained the right to vote and gained a great deal of sexual freedom. The second came shortly after World War II, when Kinsey published *Sexuality in the Human Male* in 1948 and *Sexuality in the Human Female* in 1952. The third was in the 1960s and early 70s, with the advent of the birth control pill and legalization of abortion. A fourth revolution occurred with the discovery of HIV and AIDS (**Box 15-4**) and the resulting promotion of safe sex and the use of condoms. Some might argue another sexual revolution is occurring now due to the advent of better treatments for **erectile dysfunction** and vaginal dryness.

Triphasic Human Sexual Response and Changes with Aging

Kaplan (1990), building on early work by Masters and Johnson, identified a triphasic model of **human sexual response**. The three phases are desire, excitement, and orgasm. The desire phase includes the sensations that move one to seek sexual pleasures. Sexual desire is probably stimulated by endorphins, and pleasure centers are stimulated by sex, whereas pain inhibits sexual desire. Love is a powerful stimulus to sexual desire. The excitement phase primarily occurs due to myotonia, or increased muscle tone and vasodilation of the genital blood vessels. In men the penis becomes erect. In women the vagina becomes lubricated, the clitoris and vagina become longer and wider, and the labia minora

Box 15-4 Elders and HIV

Older people (over 50) comprise approximately 10% of HIV cases—this has remained constant even though HIV in other groups is decreasing.
Older people with HIV have been ignored by the scientific community.
There is an increase in heterosexual transmission of HIV in older adults.
African American and Hispanic women report higher levels of risk-taking behaviors.
Elders may not reveal risky behaviors that are socially unacceptable, and the consequence is that elders are diagnosed at a more advanced state and HIV progresses faster.
Decreased immune function due to aging may increase the risk of HIV infection.
Drug treatment for HIV is complicated due to changes with aging in drug distribution and decreased absorption.
Polypharmacy due to comorbid conditions may increase adverse drug reactions, drug interactions, and poor adherence with complicated drug schedules.

Nursing Role:

Identify those at risk and intervene with increased referrals; provide resources and educational materials. It is likely older adults with multiple older sexual partners do not believe they are at risk of contracting HIV.
We need more qualitative and quantitative research on elders and HIV.
Advocate for elders to participate in HIV drug clinical trials.

Source: Goodroad, 2003.

extend outward. Sexual excitement is controlled by the sympathetic nervous system, and fear will inhibit sexual excitement. The orgasm phase is a climactic release of the genital vasodilation and myotonia of the excitement phase. Orgasm is an automatic spinal reflex response. Typically sexual problems can be classified as either desire, excitement, or orgasm phase disorders, or combinations of the three.

Changes in sexual response have for decades been considered normal consequences of aging. Desire may or may not change with aging; levels of desire may remain the same throughout life. However, both men and women experience changes in excitement with age. Achieving an erection may require more direct stimulation and take longer, and the erection may be softer. Ejaculation may not be as forceful, and it may not occur with every sexual encounter. Vaginal lubrication is often decreased, and women find the need for more direct stimulation. Orgasms for women include uterine contractions, and changes in the uterus may change the way an orgasm feels.

Elders differ greatly in their response to these changes. Some couples adapt by increased genital fondling and caressing, taking more time, and paying more attention to each other's needs. Sex may be better than when they were younger. Other couples may welcome an end to sex. Still others may transcend the need for sex and actually become closer (Kautz, 1995). If an elder abstains from sex for months to years when in a sexless relationship or due to loss of a sexual partner, desire will eventually decrease. This loss of sexual desire has been thought to be permanent; however, there are anecdotal reports that when a person who has not been involved in a sexual relationship for many years meets a new partner, desire will return. When those who have stopped having sex for many years start

with a new partner, some regain erectile function and vaginal lubrication after regular encounters that include genital stimulation. Still others may seek help from their health care provider, which has led to what some call the Viagra revolution.

Vaginal Dryness and Erectile Dysfunction (ED)

The decreased ability for men to achieve and maintain an erection and the decreased ability for women to achieve vaginal lubrication have, for decades, been considered normal consequences of aging (Ebersole, Hess, & Luggen, 2003). As with most changes associated with aging, changes in sexual function may begin as early as age 40, and certainly occur in almost every adult by age 80. "Sexual dysfunction is common in men and women and increases with advancing age" (International Society for Sexual and Impotence Research [ISSIR], 2004, p. 19), yet only 20%–50% seek treatment, either because of embarrassment or because they are not bothered by it. Some may not discuss the issue with their partners.

ED and vaginal dryness are also associated with chronic illnesses that increase in frequency and severity with age. In a longitudinal study, Feldman, Goldstein, Hatzichristou, Krane, & McKinlay (1994) found significant relationships between ED and age, diabetes, heart disease, hypertension, untreated gastric ulcers, and arthritis, as well as with the use of cardiac drugs and vasodilators. In a later study, Feldman et al. (2000) found correlations between ED and cigarette smoking, passive exposure to cigarette smoke, and obesity. The physiologic rationale for this is that smoking, obesity, and a sedentary lifestyle increase atherosclerosis in genital blood vessels, while stopping smoking, losing weight, and doing aerobic exercises reverse this process. Vaginal dryness in women is the physiologic correlate of ED in men, and thus it is possible that these same illnesses and lifestyle habits are correlated with vaginal dryness in women.

The introduction of sildenafil (Viagra) in 1998, and more recently vardenafil (Levitra) and tadalafil (Cialis), has changed the norms for sexual dysfunction. The constant barrage of ads in print media and junk mail, on television, and through Internet sites implies that ED is common, almost expected, and that the norm is to seek treatment. Twenty years ago, ED and vaginal dryness may have been a private matter for a couple; however, it is now literally impossible for couples to escape these ads. Ads put pressure on men and women to seek treatment who otherwise might not have considered treatment or not thought the problem was important. In addition, a woman may not want sex anymore, but she may go along when the man seeks treatment because she believes that whether or not they have sex is the man's decision (Kautz, 1995). Traditionally, vaginal dryness has been treated with lubricants or the oral or cream form of estrogen. Although there are no medications that are direct corollaries of Viagra, Levitra, and Cialis for women, women are bombarded with ads to relieve vaginal dryness and increase sexual desire with hormonal medications and nutritional/natural supplements. There are also constant ads for nutritional supplements and natural remedies for erectile dysfunction.

The clinical literature has long recommended that maintaining a healthy lifestyle will lead to more satisfying sexual relationships. Many reputable Web sites, maintained by health care organizations including the Mayo Clinic and Dr. Dean Ornish, and self-help groups such as the American Diabetes and American Heart Associations advocate healthy behaviors as a first

step in overcoming problems with erections and vaginal dryness. Books such as *A Lifetime of Sex* (George & Caine, 1998) and *Sex over 50* (Block & Bakos, 1999) recommend aerobic exercise, a low-fat diet, and stopping smoking as ways to improve sexual performance for both men and women. Nurses can focus patient education on the adoption of healthy behaviors as one step in overcoming sexual dysfunction. All patients should be told to see their physician for problems with erectile dysfunction or vaginal dryness to ensure there are not other underlying problems, and to explore all the treatment options (Lewis, Rosen, Goldstein, & Consensus Panel of Health Care Clinician Management of Erectile Dysfunction, 2003).

An example of adopting healthy behaviors in order to prevent or alleviate sexual dysfunction is the currently popular *South Beach Diet* by Agatston (2003). This diet book remained on the *New York Times* Best Seller's List for several months in 2004. One of the diet's claims to fame is the loss of belly fat first. Belly fat, especially a waist of over 40 inches in either men or women, has been associated with both erectile dysfunction and vaginal dryness, and weight loss, especially loss of belly fat, when combined with exercise, is an effective treatment for erectile dysfunction in men (Esposito, Giugliano et al., 2004) and vaginal dryness in women (Arcos, 2004). Loss of belly fat is recommended in the clinical literature, on reputable Web sites, and in books such as *In Bed with the Food Doctor, Eat Your Way to Better Sex and Better Sleep* (Edgson & Marber, 2001), and *The Better Sex Diet Book* (Fischer, 2002) as a way to increase erectile ability in men and vaginal lubrication in women.

Although studies have examined the effectiveness of Viagra in improving both erectile function and quality of life in men (Hultling, Giuliano, Quirk, et al, 1998), little is known about couples' experience with these medications. Who initiates getting a treatment, the man or his partner? Researchers are now beginning to study the effectiveness of Viagra in women (Basson, McInnes, Smith, Hodgson, & Koppiker, 2002). Dr. Irwin Goldstein, director of the Institute of Sexual Medicine at Boston University School of Medicine, recently advocated that women use Viagra for vaginal dryness. Men receive the prescription for Viagra, but it is possible that women may be the ones taking the medication. The same question can be asked of couples who use lubricants during intercourse. Do couples use lubricants to help the man achieve an erection through stimulation or to assist the woman to overcome vaginal dryness? What motivates men and women to seek treatment? What are the differences in views and experiences of men and women? Most studies of Viagra only study the men taking it, not their partners. One study (Potts, Gavey, Grace, & Vares, 2003) has noted a dearth of information about the perspectives and experiences of women whose partners take Viagra, and found there were several detrimental effects for women when their partners take Viagra.

Promoting Sexual Function in Community-Dwelling Elders

Nurses can have a tremendous impact in assisting elders who reside in the community and wish to maintain sexual function. These elders are likely to have a myriad of health problems and physical limitations due to aging. Those who wish to maintain an active sex life will need to learn to overcome and compensate for the changes. Regardless of the underlying cause(s), three major obstacles to sexual intimacy that

elders will need to overcome are fatigue, pain, and finding comfortable positions for giving and receiving pleasure. These obstacles may occur for either men or women, and for either one partner or both. The following paragraphs give practical suggestions the nursing student or nurse can recommend for patients experiencing these problems.

Overcoming Fatigue and Pain

Overcoming fatigue and pain is key to feeling desire and to having the stamina to give and receive pleasure. Fatigue and pain are addressed in detail elsewhere in this text. Common recommendations to overcome fatigue for sex are to plan for sex when rested, often in the morning. Kautz (1995) and others have found that elders who continue to have sex tend to have sex in the morning. Another key factor is to plan one's activities to save some time and energy for pleasure.

Pain is a hallmark of aging. Arthritis and other chronic illnesses have a chronic pain component that lasts until one dies. Most pain management strategies leave some residual pain, which may interfere with sexual desire and sexual excitement. The irritability, fatigue, and depression that may accompany chronic pain may also have an impact on a couple's sexual relationship. Recommendations include planning for sex at a time when the pain is at its lowest level, often mid-morning for those with rheumatoid arthritis, or when pain medications have their peak action. Incorporating massage, a hot bath for chronic arthritic pain, or cold packs for acute inflammation, or using an electric massager or vibrator may relax sore muscles, relieve stiffened joints, and when done with a partner, stimulate sexual excitement. Women may focus the water jets from a hot tub on their clitoris, and both men and women may use the vibrator for sexual stimulation. Anecdotal reports from those with arthritis suggest that both the relaxing effects of these pain relief strategies and orgasm actually relieve chronic pain for many hours. This effect is thought to be due to the endorphin release during the relaxing treatment and sexual stimulation.

Adopting New Positions and Learning New Techniques for Lovemaking

Because of limitations from disease and disability, some elders need to adopt new positions for lovemaking. Table 15-1 lists resources that give suggestions for comfortable positions as well as

Table 15-1 Resources for Information About Comfortable Positions for Intercourse

Resource	Available from
Being Close	lungline@njc.org
Chronic Low Back Pain and How It May Affect Sexuality	www.mc.uky.edu
Sex and Arthritis	www.orthop.washington.edu
Sex after Stroke	www.strokeassociation.org
Sex and Cancer (several Web articles by the American Cancer Society)	www.cancer.org
Sex and Diabetes	www.netdoctor.co.uk
Diabetes and Sex	www.tinman.com

additional information about sex and intimacy with a specific chronic illness. The illustrations in **Figure 15-2, Figure 15-3,** and **Figure 15-4** provide examples of positioning for intercourse when adapting to chronic illness or disability. **Table 15-2** lists several resources where couples can obtain educational materials and products through reputable sex education Web sites. The following two books have been written for older couples with specific chronic illnesses to assist in overcoming the clinical manifestations that are interfering with intimacy and sexual function are:

- Silverburg, C., Kaufman, M., & Odette, F. (2003). *The Ultimate Guide to Sex and Disability: For All of Us Who Live with Disabilities, Chronic Pain and Illness*. Cleis Press.
- Corn, L. (2001). *The Great American Sex Diet: Where the Only Thing You Nibble on Is Your Partner*. New York, NY: William Morrow.

Promoting Romantic and Sexual Relationships in Long-Term Care Facilities

Another issue that is rarely addressed in the literature is intimacy and sex for elders residing in long-term care facilities. Many barriers exist in virtually all facilities, including lack of privacy and door locks, lack of queen-size beds, and complete lack of opportunities for romance. Inability to leave a facility overnight without "losing the bed" prevents couples who have had long-term relationships from getting away for even one night. Although it is important for staff to protect patients from sexual abuse and ensure safety, policies and environmental design go overboard to prevent intimacy. A timeless story of love in a nursing home, *The Notebook* by Nicolas Sparks (1999), shows us what is possible if nursing staff respect the rights and privacy of those who have entrusted them with the last years of their lives. Many staff may actually promote romance and sex in long-term care, but they do

Figure 15-2 This position may be used for those with limited endurance, COPD, hip replacement, or stroke.

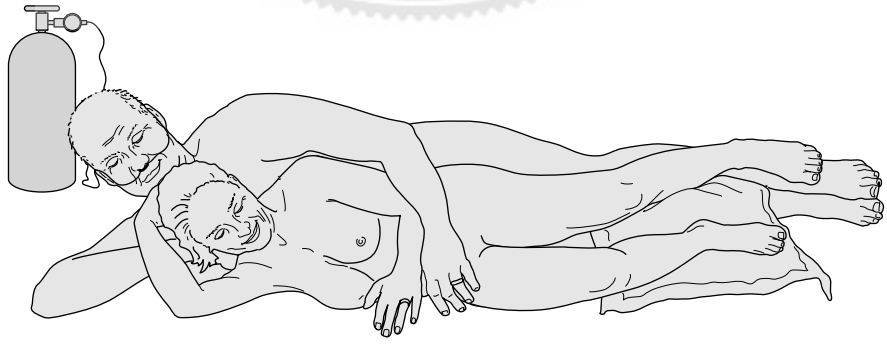
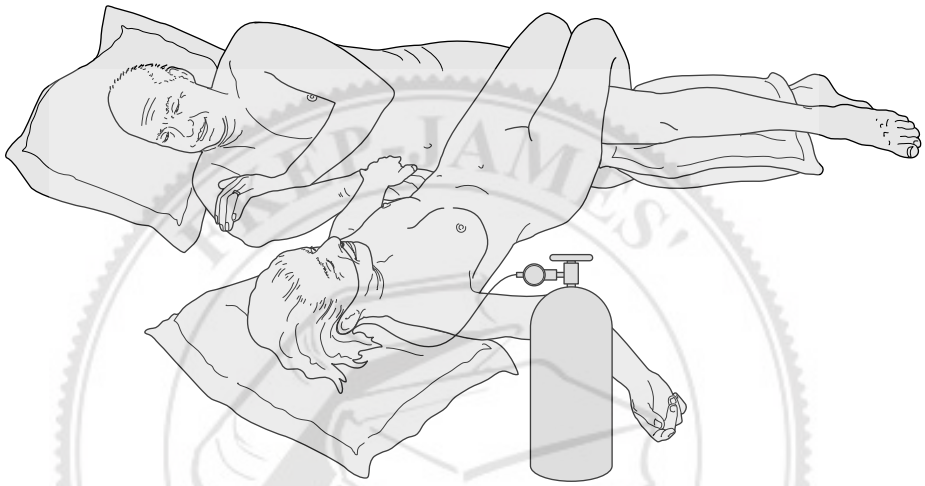


Figure 15-3 This position may be helpful when the man has hemiplegia; the woman has arthritis in her hips or has had hip or knee replacement; or the woman has lung disease. Note: If the man has had a hip replacement, he will need a pillow between his knees.



not reveal these efforts for fear of reprisal. The American Medical Directors Association (AMDA) has developed policies that can be adopted for long-term care facilities. These policies are available on the AMDA Web site, Caring for the Ages, at www.amda.com/caring/february2002/sex.htm. Messinger-Rapport, Sandhu, and Hujer (2003) also outline guidelines for sex in the nursing home, taking into account the issues of what to do if the resident is cognitively impaired, the health needs of the resident, and how to keep the staff informed so that the privacy of the couple can be maintained. The authors also recommend the video *Freedom of Sexual Expression: Dementia and Resident Rights in Long Term Care Facilities*, developed by the Hebrew Home for the Aged, a facility that is nationally known for its policies promoting intimacy between residents. This film and many others on a wide range of topics on aging, including intimacy and sexuality, are available through Terra Nova Films, www.terranova.org. Evidence-based practice guidelines that balance safety with the lifelong need for intimacy are needed. The need to be touched and held by someone who loves us, and the need to feel loved, not just cared for, does not diminish with age or physical or cognitive impairment (Edwards, 2004).

Extinguishing Sexually Inappropriate Behavior

Unfortunately, nursing staff may sometimes be confronted with an older adult, either a man or a woman, who displays sexually inappropriate behavior. Most of the incidents reported involve

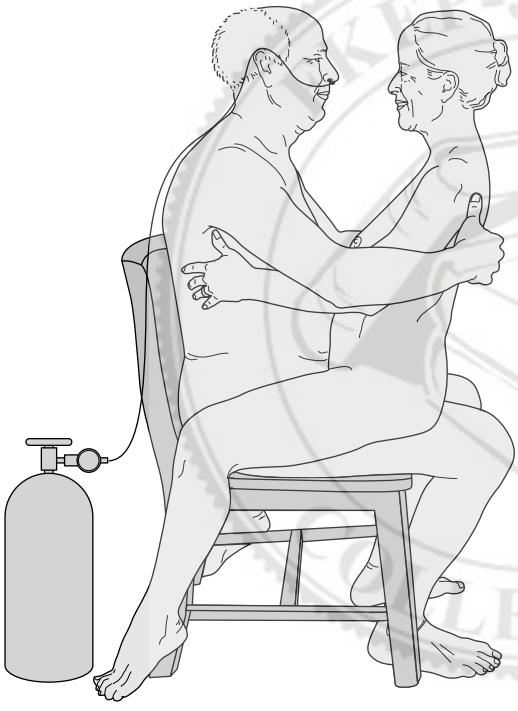


Figure 15-4 Intercourse in a chair (or wheelchair) may be an option for those with hip or knee precautions or breathing difficulties. This position should not exacerbate conditions such as back or hip pain, GERD, or symptoms of hiatal hernia.

men, but women may display these behaviors as well. Sexually inappropriate behaviors include inappropriate language ("Won't you get in the bed with me?"), inappropriate requests for personal care ("Make sure and wash my penis really good"), inappropriate gestures (sticking the tongue out and wiggling it at staff), exposing one's self or masturbating in public places, and inappropriate touching (grabbing a breast or buttock when in close proximity). All of these behaviors constitute sexual harassment, and are not to be tolerated. The behavior may reflect a power issue, a loss of inhibitions due to cognitive impairment, or a combination of these. The behaviors make it difficult or impossible to care for the patient exhibiting them. The goal is to extinguish the behavior and maintain the dignity of the patient. Nursing staff need to confront the patient calmly and firmly, saying "This behavior is inappropriate, interferes with me doing my job, and will not be tolerated." Laughing it off, reacting violently, or showing anger all are likely to encourage the behavior. Saying, "Oh Mr. _____, you wouldn't know what to do even if you could," while meant lightheartedly, is both demeaning and may encourage the patient to try the behavior with someone else. Ask other staff if the behavior is a pattern and be sure to inform others so they will not be caught off guard. One quadriplegic

Table 15-2 Sex Education Web Sites

The following are a few professional web sites that are highly recommended by the chapter author for older people to obtain sex education materials. Reassure older adults these are legitimate sex education Web sites, and are not "porno sites."

www.womenshealth.org
www.erectile-dysfunction-impotence.org
http://marriage.about.com
www.sexualhealth.com
www.sexed.com
http://sexsupport.org
www.4woman.gov (sexuality and disability for women)

client told the author that he had rubbed the breasts of every nursing staff member on the unit with his upper arm when they were leaning over him to assist in dressing. He had gotten away with this behavior for weeks because the staff had not talked with each other about this behavior. I informed the staff, and two nursing staff firmly and compassionately confronted him together, and the behavior ended. Confronting him led to several staff talking with him about his fears of dating and wishing to be seen as attractive, which was the underlying need behind this behavior.

Although extinguishing sexually inappropriate behavior is necessary to care for older adults, there is some "good news" about this behavior. It is an indicator of recovery in a client who has been too ill to think or worry about his or her sexuality. It may be an expression of power or anger, both of which are expressions of independence. Interest in sexuality can aid in the rehabilitation process. After confronting a patient, and ensuring that the client is not going to act out again, the nurse can initiate discussions about recovery and how to take an active role in that process.

When working with cognitively impaired clients who act out, confronting them may be effective in extinguishing the behavior. If this strategy does not work, other strategies may extinguish the behavior. If a client has a habit of inappropriately touching staff during a bath or bed-to-chair transfer, put a washrag in the client's hand during the bath, or place the patient's hand on the arm rest to assist in the transfer. Approach a client from the weaker side, which will both protect the staff member and discourage the client from acting out. Another strategy is to encourage appropriate behaviors and ignore inappropriate behaviors. In rehabilitative settings, rewarding appropriate behaviors can be included as part of a behavioral modification program. If possible, get family involved in extinguishing the behavior. Do not assume that the behavior is a premorbid or lifelong behavior, and try not to feed into perceptions of the client as a "dirty old man." Another strategy is for staff to avoid using language the client may misinterpret as sexual. Nurses typically say, "I am your nurse today," or "I am going to take care of you," both of which may be misinterpreted as flirting. Instead say, "I am going to work with you" or "I am going to assist you," which sound much more business-like. Lesser, Hughes, Jemelka, and Griffith (2005) outline pharmacologic therapies that may be necessary when sexually inappropriate behaviors continue despite the interventions outlined above.

Dealing with Masturbation in Public Places in Hospitals or Long-Term Care Facilities

Masturbation is self-limiting and has no known harmful effects. It does not spread sexually transmitted diseases, and can be performed with minimal cognitive and hand function. Phyllis Diller was quoted as saying that another advantage is "You don't have to get dressed up." However, masturbation is only appropriate in private. Public masturbation is best extinguished using the strategies described in the previous section for sexually inappropriate behaviors. The goal is to allow for privacy, yet not draw undue attention. If "privacy" signs are necessary, keep them innocuous. Try to provide privacy even if clients' rooms are only semi-private, by giving the client some private time. Schover and Jenson (1988), who worked extensively with head injury survivors, noted that some clients benefited from an inflatable doll to have intercourse with. Clients

using sex toys or explicit material should do so in private and store them in their own private space, away from public view.

Patients Displaying Sexually Explicit Materials on the Unit or in the Home

Display of sexually explicit materials is a problem that is ignored in the nursing literature. Nursing staff may need to set some ground rules with patients concerning posters, jokes, magazines, or cards on display on the patient's room wall or on dressers or over-bed tables. Staff need to recognize that although having these materials is the patient's choice, openly displaying them is a form of sexual harassment. A good rule is that those with a PG-13 rating, such as the *Sports Illustrated* swimsuit issue, are acceptable, but those with naked bodies are not. Rules apply equally to both men and women and apply regardless of the patient's sexual orientation. Rules also apply to staff areas; the inside of a staff member's locker may be his or her private space, but when the door is open in a public lounge, others having to view the pictures is a form of sexual harassment. Pictures are not the only problem; get-well cards that overtly encourage sexual relationships with patients and nursing staff are also inappropriate. If a patient has displayed these materials, calmly tell the patient why they are inappropriate and encourage the patient or family to remove them. Use respect when approaching a patient about offensive material. It is their home too, especially if they are in a long-term care setting. Try a compassionate approach first, focusing on your feelings. Keep the confrontation one on one if possible.

Occasionally nursing staff who visit patients in their homes may encounter sexually explicit materials on display. Tell patients you cannot work with them in the rooms in which the materials are displayed. Negotiate with the patient to have one room of the house where treatment can occur with no explicit materials displayed.

This section of the chapter has addressed a wide variety of subject areas related to sexuality and intimacy. The goal is to promote intimacy when appropriate by assisting older adults to overcome the effects of age and chronic illness.

Critical Thinking Exercises

1. Mr. Song is an older patient of Chinese descent. He wishes to observe a specific diet while in the hospital, but the menus he receives do not include the foods he eats. What is the nurse's best response in this situation? How does the nurse advocate for Mr. Song? What are some alternative solutions if the hospital cannot prepare food that Mr. Song can eat on his diet?
2. Rabbi Steinberg is an Orthodox Jewish rabbi. He observes strict practices related to his religion, including kosher diet restrictions. If the nurse is unfamiliar with these traditions, what information does she need to be able to provide spiritually and culturally sensitive care for Rabbi Steinberg? To whom could the nurse look as a resource for information?
3. Mrs. Smith is an 89-year-old African American widow who is admitted with complaints of severe chest pain. She confides to the nurse that she has no insurance and does not know how she will pay for the tests they wish to run to diagnose her problem. What is the nurse's responsibility in this situation? How can he advocate for this patient and assure that proper medical and nursing care is provided? What resources are available to help with these medical costs?

Personal Reflection

1. Have you ever cared for an older person from a different culture or ethnic group than your own? How did you feel about that experience? What did you learn?
2. Have you ever cared for an older person from a different religion than your own? How did you feel about that experience? What did you learn?
3. If an older patient was having problems dealing with sexuality after a life-changing event, how could you assist him or her? What is your comfort level with discussing sexual information with patients? How could you become more comfortable with this important aspect of nursing?
4. What resources are available in your area for older persons or those with disabilities who may need additional information and counseling about sexuality after a condition such as stroke or heart attack?

Glossary

Diversity: Differences between persons, whether ethnic, religious or cultural

Dyspareunia: Painful intercourse

Erectile Dysfunction (ED): Inability to attain or maintain an erection sufficient for intercourse

Human sexual response: Three phases: excitement, plateau, and orgasm

Racism: Discrimination against a person based on race or ethnicity

Religion: An organized set of beliefs, ways of worship; often associated with a church, synagogue, parish, or denomination

Sexuality: The total experience of being a sexual being; more than sexual intercourse

Spirituality: A feeling of connectedness with something higher than oneself, whether it be God, nature, or another being

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Section 9

Global Health Care, Health Care Systems, and Policy (Competencies 21–24)

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Chapter 16

Global Models of Health Care

Carole A. Pepa, PhD, RN

LEARNING OBJECTIVES

At the end of this chapter, the reader will be able to:

1. Compare the aging policies of Japan and Germany with those of the United States.
2. Describe the effects of an aging population on health policy.
3. Explain how morbidity and mortality can influence policies for the elderly.
4. Analyze the benefits of Social Security.
5. Compare the Medicare and Medicaid programs.
6. List the benefits and barriers to long-term care insurance.
7. Discuss the long-term care continuum.

KEY TERMS

- Acute care
- Assisted living
- Copayment
- Deductible
- Delayed retirement credit (DRC)
- Home care
- Life expectancy
- Long-term care (LTC)
- Medicaid
- Medicare
- Minimum Data Set (MDS)
- Mortality
- Nursing home
- Outcomes Assessment and Information Set (OASIS)
- Prospective payment system (PPS)
- Social Security

Meeting the needs of a rapidly growing older adult population is a challenge worldwide (Flesner, 2004). Comparing global aging policies may provide greater insights into how to best meet the challenges this population growth will create. Although much information is published about health care delivery systems in select countries, little is found about their aging policies.

International Policies on Aging

Japan

Aging in Japan is occurring at a rapid pace. In 2000, persons age 65 and over comprised 17.1% of the population (Ibe, 2000). It is estimated that by 2020, the 65 and older population will comprise 27% of the total population. In comparison, the elderly are expected to make up 16.6% of the total population in the United States and just over 24% of the population in Italy in 2020 (Elderly workers, 2001). Currently, the elderly in Japan enjoy the highest **life expectancy** in the world.

Since World War II, policies related to the elderly in Japan have undergone several changes. In 1954, the Pension Reform Act covered about 20% of the labor workforce; payments into the program were contributed by both the employee and the employer (Usui & Palley, 1997). Beginning in 1961, the National Pension Law provided coverage for the entire population. In the 1970s, benefits for the elderly were expanded to include free medical care; pension benefits were also significantly increased (Usui & Palley). However, policies in place encouraged an overuse of acute care hospitals, and during the 1980s Japan experienced a large increase in health care expenses (Usui & Palley). The Health Care for the Aged Law of 1982 terminated free medical care to the elderly; with this initiative, the elderly had to pay a small **deductible** for outpatient and hospital care. By 1985, coinsurance and **copayments** were also required. In addition to coinsurance and copayments, the 1985 act discouraged the use of acute hospitals for long-term care. The law called for an increased use of intermediate nursing care, rehabilitation, and other lower cost strategies to support discharged elderly patients (Usui & Palley, 1997). The Gold Plan of 1989 (formally called the Ten-Year Strategy to Promise Health and Welfare for the Aged) was a 10-year plan that targeted health promotion and welfare for the elderly while trying to control future cost escalation. The Gold Plan promoted three services: home help, short-stay institutions, and day services (Usui & Palley). It also included education regarding normal aging to prevent misuse of health resources by persons acting as they thought elderly persons should act. For instance, many elderly were bedridden because they believed elderly people were supposed to be bedridden (Usui & Palley). The Gold Plan was modified in 1994 to place even more emphasis on community-based care, such as respite care for caregivers, daycare centers, short-stay nursing homes, and in-home care. Although in-home care appeared to be a solution to the overuse of hospital facilities, each year 100,000 people had to leave their jobs to care for elderly family members (Watts, 2000). In addition, the system was becoming more expensive, and the administrative structure for determining eligibility was becoming too cumbersome (Ikegami, Yamauchi, & Yamada, 2003).

On April 1, 2000, the Nursing Care Insurance System was introduced. Under this program, all those age 65 and older were entitled

to receive long-term care according to their eligibility levels. The six levels of care were determined by physical and mental status; availability of family support was not considered when determining level of care required (Ikegami et al., 2003). With the allotted benefit, people could choose among agencies providing services. To fund the program, a 0.9% premium on monthly income was levied on those age 40–64; an average of $23 U.S. was deducted from the pensions of those 65 years and older (Ikegami et al.). People over the age of 64 pay 10% of their nursing costs and are charged a monthly premium as well.

With the emphasis on in-home caregivers for the Japanese elderly, elder abuse has received additional attention. The Japan Federation of Bar Associations submitted a report to the Health, Labor and Welfare Ministry at the end of 2004 that included recommendations to assist both the victims and abusers (Roundup, 2005a). According to the report, the elderly were reluctant to report abuse because they felt responsible when their children were the perpetrators, because they raised them (Roundup, 2005a). The report also revealed that the nursing care insurance program was too complicated for some people to understand. Consequently, not everyone was receiving the assistance that could help with caregiving (Roundup, 2005b). The attorney group also discovered that families caring for their elderly relatives were experiencing mental, physical, and economic hardships (Roundup, 2005a). In addition, current law creates a barrier to professionals wanting to report suspected elder abuse. Although citizens are encouraged to report child abuse and domestic violence, those who report suspected elder abuse could be charged with violating confidentiality (Roundup, 2005b).

Germany

Like other countries, Germany faces a growth in its elderly population. In 1995, those age 60 and older comprised 21% of the German population; by 2030, 36% of the population will be 60 years of age and older (Geraedts, Heller, & Harrington, 2000). Aware of the projected need, the German government integrated **long-term care (LTC)** coverage into the social security system.

The goal of the LTC insurance law was to provide relief from the financial burden of long-term disability and illness (Geraedts et al., 2000). LTC insurance became the fifth component of the German social insurance system; other components are health, accident, pension, and unemployment (Geraedts et al.).

Before LTC insurance, 80% of the elderly in nursing homes depended on public assistance, funded by local communities (Geraedts et al., 2000). This situation created a financial strain on the local communities. In addition, more family members were fulfilling the role of informal caregivers. Mental strain, lack of support, and financial hardships created when the caregiver was no longer employed outside the home made family members reluctant to assume caregiving responsibilities. To fund the LTC insurance program, one paid holiday was eliminated in all states but Saxony; this equaled 75% of the employers' contributions to the plan (Geraedts et al.).

Social insurance in Germany is a mandatory transfer system whereby employees and employers make equal contributions for LTC, health, pension, and unemployment. Only employers contribute to the accident fund (Geraedts et al., 2000). The Federal Employment Agency makes contributions to the insurance funds for those who are unemployed. Those on pensions pay 50% of their premiums for health and LTC insurance; the other 50% is paid by their pension

insurance fund (Geraedts et al.). If family members of an employee are not employed, they are covered by the employee's health and LTC insurance at no additional cost. Families with only one employed member pay the same amount for insurance as a single person in the same income bracket (Geraedts et al., 2000). German social insurance is based on the "solidarity principle," which states that "members of society are responsible for providing adequately for another's well-being through collective action" (Geraedts et al., p. 378). LTC insurance is mandatory, but those with higher incomes can purchase private insurance. All 82 million German citizens are covered by social or private LTC insurance (Geraedts et al.).

Although most aging Germans are still cared for by relatives, the LTC insurance provided incentives to establish additional home health care agencies, short-term institutional care facilities, and assisted living facilities (Geraedts et al., 2000). LTC insurance also provides cash to family caregivers and makes contributions to the pension fund if the caregiver provides more than 14 hours of caregiving a week (Geraedts et al.).

More research is encouraged to evaluate the quality of care provided under LTC insurance. Costs of the program have remained within the budget, but adjustments may be required in the future as the elderly population increases.

U.S. Health Care System and Policies

Effects of an Aging Society

The elderly population of the United States also is expected to increase, consistent with the increase in the elderly population worldwide. By the year 2050, projections indicate that 30% of the population will be over the age of 65 years; the population over the age of 85 is expected to double, and the population under the age of 35 years will decline by 10% (Sultz & Young, 2004). This increase in the elderly population is expected to bring challenges to policymakers. The future population of the elderly is expected to be better educated, more active, and more culturally diverse than the current population (Sultz & Young). This increase in the elderly population will create economic challenges such as how to finance long-term care. The shift in the demographic makeup of the population will create disequilibrium in the ratio between the working middle age population and the traditionally retired elderly population. Currently, there are 3.3 workers for every Social Security beneficiary; by the year 2030, there will be 2.2 workers for every beneficiary (Triest, 1999). More financial support will be needed. In response to these needs, creative health care delivery models will be required.

Effects of Mortality

With an increase in the aging population, a concomitant increase in chronic diseases is expected (Flesner, 2004; Sultz & Young, 2004). Interdisciplinary teams of health care providers with expertise in geriatrics will be needed to meet the physical and psychosocial consequences of these illnesses (Sultz & Young).

Mortality is commonly measured by life expectancy, usually computed at birth and at age 65 years (Williams, 2002). Life expectancy at birth in the United States is 77.1 years, which places it with most other developed nations in the life expectancy range of 76 to 78 years (Kinsella & Velkoff, 2001). The United States is behind the countries of Japan and Singapore

(the highest at 80 years), and Australia, Canada, Italy, Iceland, Sweden, and Switzerland (79 years) (Kinsella & Velkoff). Health practices in childhood and young adulthood influence the health of individuals as they age (Kinsella & Velkoff). As people are living longer, measures that support health promotion and illness prevention in childhood and through young and middle adulthood will produce a healthier older adult population. An emphasis on preventing some chronic illnesses or decreasing their debilitating effects will help to decrease the cost of health care for the elderly. Currently, health expenditures by and for the elderly are disproportionate to the distribution of the elderly in the general population (Kinsella & Velkoff).

Social Security

During the Great Depression, unemployment affected nearly 25% of the elderly (Kart & Kinney, 2001). Many middle and upper income individuals were affected as estate values and financial resources plummeted. It was during this time of financial stress that interest in an old-age pension was sparked. With the passing of the **Social Security** Act of 1935, the United States became one of the last industrial nations to establish a federal old-age pension program. However, the original Social Security Act did not provide benefits comparable to those provided by other industrial nations. The Social Security Act was strengthened, however, with the addition of survivors' and dependents' benefits (1939), disability insurance (1956), Medicare (1965), and automatic adjustment of benefits for inflation and supplemental income (1972).The Social Security Act provided a safety net of income in return for a lifetime of employment; it never was intended to provide the sole source of retirement income. It also provided a standard age by which retirement could be defined (Kart & Kinney). Participation in the Social Security system is mandatory through payroll taxes called "contributions" (Kart & Kinney). No means test is required to receive benefits; rather, it is an earnings-related program. Benefits are financed by payroll taxes paid by employees and employers on income up to a certain level.

Basic benefits, available upon retirement at age 65, are based on a worker's average indexed monthly earnings in covered employment (Kart & Kinney, 2001). Over half of the Social Security beneficiaries do not receive the full benefit, however. One reason is related to early retirement. Eligible individuals age 62–64 may receive reduced Social Security benefits; benefits are reduced by 1/180 for each month before age 65 that an individual begins to collect benefits. Conversely, an eligible worker can increase full Social Security benefits through **delayed retirement credit (DRC)**. If a worker postpones retirement past age 65 and up to age 70, the worker will receive more than the earned full benefit for which he or she was eligible for at age 65 (Kart & Kinney). The Social Security Administration uses a retirement test to determine if a person is actually retired and eligible for Social Security benefits. Until age 70, benefits are reduced to those individuals who earn a certain amount of money while "retired" (Kart & Kinney). A criticism of the retirement test is that it is a disincentive to those who continue to work at another job while officially retired.

Social Security has decreased poverty rates of the elderly, particularly for female elderly. Half of the older women in America would live in poverty without their Social Security income (Meier, 2000). Approximately 75% of the poor elderly are women who largely depend on Social

Security for the major source of their income; many have no other income source (Meier). Women represent 60% of all Social Security recipients at age 65; at age 85, women represent 71% of all Social Security recipients (Meier).

Medicare

Medicare is Title XVIII of the Social Security Act; it was passed in 1965, after years of trying to provide some kind of universal health insurance. It is an insurance program for those 65 and over who have paid into the Social Security system, the railroad fund, or are diagnosed with end stage renal disease. Those collecting Social Security Disability Insurance (SSDI) are eligible for Medicare after a 24-month waiting period. When Medicare was enacted, nearly one in three elderly were poor, and about half of America's elderly did not have hospital insurance (De Lew, 2000).

Medicare is divided into Part A and Part B. Part A is hospital insurance and is the insurance entitled to those eligible for Social Security. Part B is Supplemental Medical Insurance (SMI). Participation in Medicare Part B is not mandatory and is not funded by the trust fund. Participants pay for Part B out of their Social Security checks. In 2005, Medicare Part B required a $110 deductible and a premium of $78.20/month. This was an increase of around $11.60/month from 2004; the increase from 2003–2004 was around $10 (Medicare and you, 2005).

For reimbursement purposes, Medicare establishes benefit periods. A benefit period consists of 90 days of inpatient care. When a patient is admitted to a hospital for inpatient care, the benefit period begins. In 2005, for each benefit period the beneficiary was required to pay a deductible of $912. If a patient is in the hospital for more than 60 days, a further charge of $228/day is incurred. If a patient is in the hospital more than 90 days, then the beneficiary begins to use his or her lifetime reserve of 60 days. The cost of using lifetime reserve days is $456/day. All figures are amounts due in 2005; these charges increased from 2004 (Medicare and you, 2005).

When Medicare was proposed, private sector insurance plans were used as the models for coverage, administration, and payment methods (De Lew, 2000). Initially, Medicare did not cover dental care, routine eye care and glasses, hearing aids, preventive services, prescriptions, or long-term care. With the passing of the Medicare Prescription Drug Improvement and Modernization Act of 2003, Medicare pays for a portion of outpatient medications with the use of a Medicare Discount Card. From May 2004 to December 2005, only the discount card was available; after that time, additional and complex partial reimbursement mechanisms began. Medicare will also reimburse for some screenings on a regular basis and a physical exam when the beneficiary first becomes eligible for Medicare services. Medicare also will reimburse for 100 days in a skilled nursing facility to prepare the patient for returning home, but Medicare does not pay for routine nursing home care. Patients are required to pay a copayment of up to $109.50/day for days over 20 in the facility, however. Medicare also covers hospice care for those patients who have been certified by the physician as having 6 months or less to live. Medicare covers care provided by a Medicare certified hospice agency. Medicare also covers home care provided by a Medicare certified agency. All of these services have criteria that must be met for reimbursement (Medicare and you, 2005).

Medicare Part B pays for physician services, some home care, and some equipment. In addi-

tion to the $100/year deductible, beneficiaries are required to pay 20% of the usual and customary charges. If a physician accepts Medicare assignment, then whatever Medicare pays the physician, the physician accepts that as reimbursement. If the physician does not accept Medicare assignment, then the patient is responsible for any additional cost Medicare does not reimburse the physician (Medicare and you, 2005). This is a question that all older adults should ask of their physicians prior to a visit.

The Balanced Budget Act of 1997 included extensive changes to the Medicare system. Some of the changes included: 1) payments to providers were reduced; 2) preventive benefits were expanded; 3) Medicare + Choice, a managed care option, and other health plan choices with a coordinated open enrollment process were added; and 4) new home health, skilled nursing facility, inpatient rehabilitation, and outpatient hospital prospective payment guidelines for Medicare services were included to help decrease spending growth (De Lew, 2000). The Balanced Budget Refinement Act of 1999 restored some of the Medicare payments that had been reduced in the 1997 Balanced Budget Act. In 2005, the managed care options for Medicare were changed from Medicare + Choice to Medicare Advantage. A beneficiary must have both Medicare Parts A and B to join one of the managed care plans (Medicare and you, 2005).

Medicaid

Medicaid is Title XIX of the Social Security Act. It is an assistance program that is jointly financed by state and federal governments; therefore, coverage and eligibility differ from state to state. To qualify for Medicaid, an individual must fit into a category of eligibility and meet the financial and resource standards. Medicaid provides three types of health protection: 1) health insurance for low income families and people with disabilities, 2) long-term care (LTC) for older Americans and persons with disabilities, and 3) supplemental coverage for low-income Medicare beneficiaries for services not covered by Medicare (e.g., eyeglasses, hearing aids, prescription drugs) as well as Medicare Part B premiums and Medicare Parts A and B deductibles and copayments (Provost & Hughes, 2000).

Federal funding for Medicaid comes from the general revenues; there is no trust fund set up for Medicaid as there is for Medicare. The state Medicaid office directly pays the doctor, hospital, nursing home, or other health care provider. Not all physicians will accept Medicaid patients because physicians must accept as payment what Medicaid reimburses. In some instances, this reimbursement may be less than the cost to provide the service.

The elderly account for a disproportionate share of Medicaid cost. For example, in 1998, although only about 11% of the Medicaid recipients were elderly, they accounted for approximately 31% of Medicaid reimbursement (Provost & Hughes, 2000). The fact that Medicaid is the primary reimbursement mechanism for LTC explains this phenomenon (Provost & Hughes). In an attempt to decrease high-cost nursing home care, Medicaid instituted a waiver program to facilitate home and community-based care delivery (Provost & Hughes). Many states have instituted programs that support low income elderly in their homes to prevent or delay nursing home placement. In another attempt to curtail Medicaid spending, many states have initiated a managed care model for Medicaid services.

Although eligibility for Medicaid is different in each state, each state does require an individual

and family to use their own resources (spend down) before they can become eligible to receive Medicaid reimbursement for LTC. Usually, an unmarried individual is allowed a small amount of personal property (in Indiana, for example, this is $1,500). If the recipient of nursing home care is married, and the spouse is remaining in the couple's home, the spouse is allowed to keep half of the total nonexempt resources jointly owned when the individual entered the nursing home. There are upper as well as lower limits to the amount the spouse can keep. Rules also cover property given away as a gift so family members cannot give away as gifts resources that could be used to pay for care.

Long-Term Care Insurance

Although it has increased in popularity, long-term care insurance plays a relatively minor role in financing long-term care (Bodenheimer & Grumbach, 2005). One barrier to long-term care insurance is the cost. For the elderly, because they are a population at high risk to use the benefits, the cost is high when compared with income. Ideally, healthy middle-aged adults would be buying long-term care insurance against future need, but this is not happening to a large degree. Many employers are now offering long-term care insurance as an employee benefit. As a rule, companies offering long-term care insurance as a benefit do not contribute to offset the cost, but they do provide group rates for their employees (Sultz & Young, 2004).

Long-term care insurance can provide a wide spectrum of benefits; home care, assisted living, and nursing home care are among the care options that may be covered. Policies may also vary according to policy restrictions. Some policies may require a deductible, which is stated in terms of nursing home days (e.g., the cost of 90 nursing home days could be a deductible). Also, it is not uncommon for policies to provide a fixed daily fee, rather than the actual cost (e.g., the benefit may be $90/day whereas the cost per day is $140/day). When the deductible and fixed daily fee are considered, even with long-term care insurance, out-of-pocket expenses could be considerable. Also, some policies require a certain amount of disability before benefits will be paid; for example, a beneficiary may need to have functional dependency in three areas before services would be reimbursed (Bodenheimer & Grumbach, 2005). Therefore, not all who desire long-term care may qualify for it under their insurance coverage. Buyers considering long-term care insurance are cautioned to investigate the policy coverage in terms of deductible, coverage, dependency requirements, preadmission hospitalization requirements, and lifetime benefit ceilings (Bodenheimer & Grumbach).

Settings for Care in the United States

Acute Care

The elderly use **acute care** hospitals at a rate greater than any other age group. The rate of hospitalization for the elderly increased by 23% over the past 30 years in spite of a decline in hospitalizations in the 1980s; hospitalizations for other age groups declined overall (Hall & Owings, 2002). From 1990–2000, the discharge rate among the elderly increased 8% while the rate decreased by 18% among 15–44 year olds and by 16% among 45–64 year olds. The discharge rate for children 15 and under did not change (Hall & Owings). The elderly comprised 20% of all hospital discharges and used one third of the hospi-

tal days in 1970. In 2000, the elderly compiled nearly 40% of the discharges and used almost half of the hospital days (Hall & Owings). Overall, average lengths of stay for those 65 and older were longer than for any other age group (Hall & Owings; Shi & Singh, 2005).

Medicare may reimburse for acute care of the elderly after deductible and copayments are made. Under the Diagnosis Related Groupings (DRG) system, hospitals have an incentive to discharge a patient as soon as medically possible. The combination of high use and incentive for discharge as quickly as medically possible creates a need for discharge planning and a continuum of services and nurses with expertise in geriatric physical assessment.

Long-Term Care

Long-term care "refers to health, mental health, social, and residential services provided to a temporarily or chronically disabled person over an extended period of time with a goal of enabling the person to function as independently as possible" (Evashwick, 2002, p. 236). Most long-term care is community and institutionally based.

Home Care

Home care is part of the continuum of long-term care. It includes skilled nursing care and therapies, personal care services, homemaker/handyman services, durable medical equipment, high-technology home services, and hospice (Evashwick, 2002). These services may be provided by one agency or by a group of agencies. Home care agencies may be freestanding or facility based. Freestanding agencies include visiting nurses associations, which are voluntary, and not-for-profit organizations governed by a board of directors. Now sometimes a generic term for all home care agencies, visiting nurses associations were originally discrete agencies with a common history (Evashwick). Public or official agencies are government agencies supported by tax dollars and operated by a local, county, or state government. Public agencies may provide home care services, but their primary purpose is public health. Proprietary home care agencies are free-standing for-profit agencies. Private not-for-profit agencies are privately owned and operated. Facility-based agencies may be hospital-based, which are an integral part of the hospital organization; skilled nursing facilities; agencies based in skilled nursing facilities; or rehabilitation agencies based in rehabilitation hospitals or clinics. Home care agencies are further divided as Medicare certified and non-Medicare certified. Home visits to the elderly who are eligible for Medicare are reimbursed if certain conditions are met. **Box 16-1** highlights Medicare criteria for home care reimbursement.

Agency evaluation of the home visit process is achieved through agency outcomes-based quality improvement projects and through the

Box 16-1 Criteria for Medicare Reimbursement of Home Care Visits

1. Care must be provided by a Medicare certified agency.
2. Plan of care is certified by a physician every 60 days.
3. Client is homebound.
4. Client requires intermittent skilled nursing care or physical, occupational, or speech therapy.

Outcomes Assessment and Information Set (OASIS). OASIS is a standard set of 10 client identification items and 79 items assessing client health and functional status; the data set is used to identify client needs and assess the effectiveness of home care interventions (Clark, 2003). OASIS information must be obtained at the beginning and end of service as well as every 60 days, coinciding with the certification period. Consumers as well as health care providers can use the OASIS data to compare agencies through the Medicare Web site at http://www.medicare.gov.

Assisted Living

Assisted living is another component of the long-term care continuum. Although there is no common definition for assisted living, policies in many states include the philosophies of resident independence, autonomy, dignity, and privacy (Mollica, 1998). Mollica concluded that assisted living is evolving as a residential rather than institutional model. In an assisted living environment, the resident can determine which services are received as well as when and how these services should be delivered (Chapin & Dobbs-Kepper, 2001). Services generally included in an assisted living facility are congregate meals (although residents can choose to eat some meals in their rooms to decrease costs), 24-hour monitoring for emergencies, and medication supervision (Sultz & Young, 2004). If residents require intermittent skilled nursing care for a dressing change, often nursing care will be provided through a home care agency. Aging in place has been an integral philosophy of assisted living facilities. Key to this philosophy is that a facility must adjust its service provision and level of care to meet the residents' changing needs (Chapin & Dobbs-Kepper).

Most residents seek assisted living facilities because they need help with activities of daily living (ADLs), but they do not require constant care (**Case Study 16-1**). Assisted living facilities are not substitutes for **nursing home** care; instead they bridge the care need between living independently at home and nursing home care. About 36% of assisted living residents eventually go to a nursing home because their needs can no longer be met at the assisted living facility. Another 2% go to nursing homes because they can no longer afford their care (Is assisted living, 2001). One concern of assisted living is its affordability. "Affordability is critical in trying to make independent, autonomous, and dignified living available for all seniors, no matter their financial resources" (Piotrowski, 2003, p. 26). Currently, care at an assisted living facility can exceed $4,000 a month depending on the size of the unit and the services required (Is assisted living, 2001), although the average monthly cost is estimated at $1,800 (Sultz & Young). Most costs for assisted living are paid for out of pocket, but long-term care insurance, Social Security Supplemental Income, and, in 37 states, Medicaid may assist with the cost (Sultz & Young). Facilities may charge fees for additional services such as meal choices and additional personal care (Is assisted living, 2001).

Long-Term Care Facility (Nursing Home)

According to Nursing Home Info (2003), a nursing home "provides skilled nursing care and rehabilitation services to people with illnesses, injuries, or functional disabilities." Nursing homes may provide both skilled nursing and intermediate care. Those with skilled nursing facilities (SNF) can provide nursing care to individuals who require a higher level of care for a

Case Study 16-1

Anna Broom is a 76-year-old widow who recently had bilateral knee replacements. She is completing her inpatient rehabilitation, and the nurses are exploring with her the need for referral to postdischarge care. Anna's husband of 52 years died 2 years ago from renal failure subsequent to sepsis, and she lived alone in a tri-level home before her surgery. Two of her children live in the same city. Both work, and they are concerned about their mother's safety upon discharge because she must go up 8 stairs to get to the bedroom and bathroom in her own home. Before surgery, Anna was taking atenolol and a baby aspirin; she was also getting a little forgetful. Upon discharge, Anna will be on Coumadin for at least 2 weeks, so she will need a protime and INR drawn weekly to determine dosage. She will resume her atenolol, but not the baby aspirin.

1. What are Anna's options for care after discharge?
2. What assessments should the nurse make to help determine an appropriate postdischarge referral?
3. What decision should be made about postdischarge care?

short amount of time. Skilled nursing units often bridge the care needs between hospital and home care. When patients are medically stable, have used hospital days allotted to them under the **prospective payment system (PPS)**, and yet are not ready to be cared for at home, Medicare will reimburse for skilled nursing care in a Medicare certified agency for 100 days each benefit period. After 20 days in a skilled nursing facility, the beneficiary must pay a copayment of up to $109.50/day (Medicare and you, 2005). A benefit period begins the day of admission to an SNF and ends when skilled nursing care has not been received for 60 days in a row (Medicare.gov, 2005).

Individuals who require constant nursing care for stable, chronic conditions are not eligible for Medicare reimbursement. For these patients, care in a nursing home as part of the continuum of long-term care is an option. Each state defines what constitutes a nursing home; no federal guidelines define a nursing home. Nursing homes may be owned by private, for-profit corporations; not-for-profit organizations; religious-affiliated organizations; or government entities (Medicare.gov, 2005). All nursing homes who desire to provide beds for residents who qualify for Medicaid must be Medicaid certified, indicating that they have met defined standards of care and services. Nursing homes may have beds certified as Medicaid, Medicare (SNF), or private pay (Medicare.gov, 2005).

Two major concerns face nursing homes today. One is the overall quality of care, and the

second is the decline in Medicaid reimbursement. As the cost of care increases and Medicaid reimbursement remains flat, in effect, reimbursement has declined because the percentage of actual cost covered by the reimbursement is less. Hicks, Rantz, Petroski, and Mukamel (2004) investigated the relationship between variable nursing home costs and outcome of care measures. Outcome measures used were 1) decline in ADLs, 2) development of pressure ulcers, 3) weight loss, and 4) psychotropic drug use. Results indicated that, collectively, these quality outcome measures can substantially impact the cost of nursing home of care. The balance of cost and quality can place nursing homes in a precarious position because they are under constant pressure to improve performance and keep costs down (Scott, Vojir, Jones, & Moore, 2005). Nursing homes must compile data on resident health and outcomes on a regular basis; data are collected in a **Minimum Data Set (MDS)**. These data are used to compare performances of nursing homes nationwide. The Medicare Nursing Home Report Card comparing nursing homes is available on the Medicare Web site at http://www.medicare.gov.

Maas (2004) proposed the need for a new paradigm for long-term care. According to Maas, in today's nursing home environment, medical care is assumed most important, with the accompanying custodial care considered satisfactory. She posited a new paradigm that would abandon the medical-custodial model in favor of one that emphasized holistic, interdisciplinary care with multiple strategies to meet the needs of the older adult. In this paradigm, the roles of geriatric nurses and geriatric best practices would be emphasized. Maas also proposed extending Medicare and Medicaid reimbursement to advance practice nurses and nurses with specific gerontological training for nurse case management and interventions.

Personal Reflection

1. Access the Medicare Web site at www.medicare.gov and access the home health agency comparison data. Explain how the care you provided an elderly client and family through a home care agency is reflected in these comparison data.
2. Visit an assisted living facility and a nursing home in your area. What was your impression of the two settings for care?
3. Interview someone who has come from another country. Explore with this person how the elderly were cared for in his or her country. Would that health policy be a viable model for the United States?

Box 16-2 Research Highlight

Aim: The purpose of this study was threefold: 1) describe the characteristics of hospitalized older adults who were not referred for home care; 2) compare the referral decisions of hospital clinicians with those of nurses with expertise in discharge planning and transitional care; and 3) compare the characteristics of hospitalized older adults who did not receive a home care referral with those of patients who did receive a home care referral.

Methods: The sample for this secondary analysis consisted of patients 65 years of age and older; 75 received home care after hospital discharge and 99 did not. A descriptive case study design was employed. Measures of sociodemographic data, self-rated health status, functional status, and depression were available in the original data. No additional data were collected. Original research records were reviewed to identify characteristics associated with the need for home care, likelihood of postdischarge referral, or the development of poor discharge outcomes. Expert nurses in transitional care and discharge planning reviewed each patient profile and determined the need for postdischarge referral. Data were analyzed using descriptive statistics, content analysis, Chi-square, and *t*-tests.

Conclusion: The expert nurses disagreed with the hospital clinicians regarding referral decisions on 97% of the cases. Patients who received home care referral were older, had longer hospitalizations, more often rated their health as fair or poor, and had worse functional status than those not referred to home care. Many of those who were not referred to home care demonstrated characteristics associated with the need for home care referral, with the likelihood of receiving a referral, or with developing poor postdischarge outcomes. Findings suggest the need to assist hospital clinicians to identify patients who would benefit from home care referral.

Source: Bowles, K. H., Naylor, M. D., & Foust, J. B. (2002). Patient characteristics at hospital discharge and a comparison of home care referral decisions. *Journal of the American Geriatrics Association, 50*, 336–342.

Box 16-3 Resource List

Aging and Policy

American Association for Long-Term Care Insurance
http://www.aaltci.org

Centers for Medicare and Medicaid
http://cms.hhs.gov

Department of Health and Human Services
www.hhs.gov

Medicare National Nursing Home Database and Surveys
www.medicare.gov/NHcompare/home.asp

U.S. Administration on Aging
http://www.aoa.dhhs.gov

Settings for Care

Assisted Living Federation of America
www.alfa.org

National Association of Home Care and Hospice
http://www.nahc.org

National Center for Assisted Living
http://www.ncal.org

Nursing Home Info
www.nursinghomeinfo.com

Critical Thinking Exercises

1. Access the Medicare Web site at www.medicare.gov and compare the long-term care facilities in your area. What are the comparison indicators? How do the facilities compare? Explain how the nurse would use this information when discussing care options to an older adult.
2. In a small group, create a model for health care delivery for the year 2030. Identify which features would be present, why these features would be necessary, and how it would be financed. Explain the role of the professional nurse and the advanced practice nurse as well as other health care providers.
3. In a small group, compare health policies for the elderly in Japan, Germany, and the United States. Identify the strengths and weaknesses of each model.
4. **Box 16-4** lists some recommended readings. Choose one reference of interest to read, and share the information with a classmate.

Box 16-4 Recommended Readings

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Glossary

Acute care: Short-term, episodic care

Assisted living: Living arrangement that provides minimal assistance with activities of daily living and personal care services such as meals and housekeeping

Copayment: The amount of money one pays to the care provider in addition to what the insurance pays

Deductible: The amount of money one pays to a provider before the insurance benefits are activated

Delayed retirement credit (DRC): Additional money one can earn in addition to full Social Security benefits if one works past age 65.

Home care: Services provided in the home of a home-bound person; may include skilled nursing, therapy, home health aides

Life expectancy: How long one can expect to live based on statistical probability; usually calculated at birth and at age 65

Long-term care: A variety of services to help persons with personal or health care needs over a period of time; usually custodial care in a nursing home type of facility

Medicaid: Title XIX of the Social Security Act; a welfare program

Medicare: Title XVIII of the Social Security Act; an insurance program

Minimum Data Set (MDS): Standardized data on resident health and outcomes; used as a quality indicator in nursing homes

Mortality: Death

Nursing home: A facility that provides daily help for residents with physical or other problems who are unable to live on their own

Outcomes Assessment and Information Set (OASIS): Standardized information assessing client health and functional status in home care; used as a quality indicator

Prospective Payment System (PPS): System whereby payment to the health care provider is determined before services are used; established to contain cost, particularly in the Medicare system

Social Security: A federal program that provides financial assistance to the elderly and disabled; Federal "old age" pension program

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Unit Two

Role Development

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Section 10

Provider of Care (Competencies 25, 26)

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Chapter 17

The Interdisciplinary Team

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LEARNING OBJECTIVES

At the end of this chapter, the reader will be able to:

1. Distinguish between multidisciplinary and interdisciplinary teams.
2. Describe the roles and educational background of each team member.
3. Discuss the challenges and benefits of interdisciplinary geriatric teams.
4. Appreciate the unique contributions that the interdisciplinary geriatric team can make towards helping older adults achieve their maximal levels of independence.

KEY TERMS

- Acute care for elders (ACE)
- Geriatric assessment interdisciplinary team (GAIT)
- Geriatric assessment team (GAT)
- Geriatric evaluation and management (GEM)
- Geriatric interdiscplinary team training (GITT)
- Interdisciplinary teams
- Multidisciplinary teams

The elderly deal with normal age changes, the impact of chronic illness, and the realities of real or potential changes in function or cognition. Their needs for health care are best served through a comprehensive collaborative approach to assessment and care (Reuben et al., 2004). This is most frequently referred to as an interdisciplinary team.

The concept of interdisciplinary teams has been discussed in the health care literature since early in the twentieth century. The underlying "assumption [is] that an interdisciplinary team will bring together diverse skills and expertise to provide more effective, better coordinated, [and] better quality services for clients" (Ducanis & Golin, 1979, p. 1). In gerontology, interest in collaboration has been enhanced through formal efforts by the Department of Veterans Affairs (Reuben et al., 2004) and grants that supported the development of geriatric assessment centers and **geriatric interdisciplinary team training (GITT)** (Siegler, Hyer, Fulmer, & Mezey, 1998).

This chapter begins with an overview of the concept of teams. A discussion of geriatric teams and their potential members along with educational efforts to prepare health professionals for collaborative roles is presented. The chapter concludes with a discussion of common challenges and benefits found in the geriatric team experience.

Teams

There is no one consistent definition of *team* in health care. The idea of teams conjures up sports analogies as one thinks of groups of individuals with various skills and roles working together for a common end: winning a game. A batter alone does not win a baseball game nor does a linebacker win a football game. Instead, all the team's players bring different perspectives and skills and work together to complement or build on one another's efforts to achieve the common goal of winning. This analogy fits well when one considers a variety of health professionals, each with different perspectives, knowledge, and skills, all wanting to provide effective care for the same individual. Where the analogy fails is the lack of a common vision of what the process and end products are and how professionals can effectively work together. Various disciplines have different views of teams and teamwork. Some may see teams as collaborative and egalitarian whereas others see teams as groups of individuals having a top-down perspective with one person in charge. With no common language among health professionals nor expectation of interdependence, teams continue to be a work in progress.

Early literature related to teams is found in psychiatric and rehabilitation areas (Ducanis & Golin, 1979). In both of these specialties a number of different disciplines work in the same settings with the same patients. Efforts to come together in assessing needs and developing treatment plans became part of their practice due to this proximity along with an appreciation of or frustration with each other's roles. Over the past 50 years, discussions of teams and team approaches have evolved, working to define the roles and responsibilities of different team efforts.

Teams have been defined in terms of why they exist; for example, they may be client centered or task centered (Ducanis & Golan, 1979). They also are defined in terms of how the team is seen to function for example as multidisciplinary or interdisciplinary. **Multidisciplinary teams** function as a group (multiple) of professionals who work loosely in the same area or with the same client. **Interdisciplinary teams** are an

interconnected group of professionals who have common and collective goals. Another way to describe multidisciplinary and interdisciplinary is to see multidisciplinary as sequential, with each discipline applying their assessment and intervention within their own silo (Siegler et al., 1998), whereas interdisciplinary teams have an interactive approach to care. Today the terms *multidisciplinary* and *interdisciplinary* are often used interchangeably, which further confuses the issue.

Interdisciplinary teams include members from different disciplines who together undertake specified activities as a group with the client. Although each of the health professionals brings his or her own expertise (Greiner & Knebel, 2003), collectively they assume the basic roles of sharing information and coordinating care to provide a coherent and cohesive service to the client. On a more advanced level, the members of an interdisciplinary team tackle complex problem solving, are interdependent in their work, and as one share accountability for outcomes. Rowe notes, "an interdisciplinary approach recognizes that many clinical problems outstrip the tools of individual disciplines and entails several health care providers simultaneously and cooperatively evaluating the patient and developing a joint plan of action" (1998, p. vii). In the most effective teams the client (and/or caregiver) is an active team member and is expected to participate in goal setting and care planning. Most would say the client is always part of an interdisciplinary team or it is not a true team. Interdisciplinary teamwork is an evolving process requiring communication and negotiation in a mutually respectful environment by all involved (Lindeke & Sieckert, 2005).

In geriatrics, teams are seen in all aspects of care, but the most common areas are in geriatric assessment and geriatric treatment. The needs for a team are based on the complex issues presented by the elderly; the benefits include coordination and integration of care assessment and planning (Howe, Sherman, Amato, & Banc, 2002; Tsukuda, 1998; Vazirani, Hays, Shapiro, & Cowan, 2005). An interdisciplinary approach provides more holistic and comprehensive care.

Table 17-1 provides a summary of the common disciplines involved in geriatric teams. Adapted from a geriatrics interdisciplinary curriculum (Howe et al., 2002), this table shares professional titles, a description of education, and roles/skills important to the elderly, and also includes links to the professional organizations and/or specific gerontology resources for the profession. The most common reason for the member to be on the team is the unique body of knowledge they bring to the assessment or treatment aspect of the services offered (**Box 17-1**).

As can be seen in Table 17-1, the "who" in a team can include any of a number of health care professionals along with the client and family or caregiver. If, instead of a series of appointments, a geriatric team provided assessments, this might be accomplished in a consultative assessment visit with the team (**Case Study** 17-1). The deciding factor for team membership is the aim of the assessment or treatment. Beyond the client, teams may include any combination of geriatricians, registered nurses, nurse practitioners, physicians, physician assistants, social workers, psychologists, psychiatrists, pharmacists, occupational therapists, physical therapists, speech pathologists, and chaplains (Agostini, Baker, Inouye, & Bogardus, 2001; Hartford Foundation, 2001; Howe et al., 2002; Siegler, et al., 1998). Going beyond the traditional health care team seen in inpatient and outpatient settings, teams may also be formed by including others outside of health care that are

Table 17-1 DISCIPLINES, EDUCATION, ROLES, AND WEB RESOURCES IN GERONTOLOGY

Discipline	Education/Certification Licensure	Role in Gerontology	Web Resources
Audiologist	Master's degree Certificate of clinical competence National exam	Assesses hearing including audiometric studies, evoked potentials, and other diagnostic procedures and treatment of hearing loss.	• American Speech-Language-Hearing Association (ASHA) Division 15, Gerontology: http://www.asha.org/about/membership-certification/divs/div_15.htm
Caregiver		Varying degrees of expertise	• National Family Caregivers Association: http://www.nfcacares.org/index.cfm • Empowering Caregivers: http://www.care-givers.com/pages/elderly.html
Religious workers, including chaplain, priest, rabbi, minister	Education varies depending on requirements of religion and requirements of institution	Provide support to the client/patient, family, and others as it relates to spiritual needs. May assist in identifying resources from within congregation for support, visitation, or respite.	• Center for Aging, Religion and Spirituality: http://aging-religion-spirituality.com • Forum on Religion, and Spirituality and Aging: http://www.asaging.org/FORSA/
Client/patient	Life experience	Expert in his or her experience	
Geriatrician	Licensed medical physician with fellowship (2 years) in gerontology, postmedical internship, and residency board certification	Utilizes knowledge of normal aging as part of assessment. Specializes in the diagnosis and treatment of the elderly.	• Geriatric Medicine Training and Practice in the United States at the Beginning of the 21st Century: http://www.adgapstudy.uc.edu/PDF/ADGAPFullReport.pdf • Education in Geriatric Medicine: http://www.americangeriatrics.org/products/positionpapers/edu_ger.shtml

Dietician	Bachelor's degree Internship National exam	Assesses nutritional status and implements nutritional plan.	• Gerontological Nutritionists DPG: http://www.eatright.org/Public/ContinuingEducation/index_dpg11.cfm
Advanced gerontological nurse practitioner	Master's degree as a gerontological nurse practitioner National certification State licensure	Provides primary care including history and physical, and chronic disease management. Note: Adult nurse practitioners, family nurse practitioners, and palliative nursing practitioners may also have a role in geriatrics management.	• National Conference of Gerontological Nurse Practitioners: http://www.ncgnp.org/index.cfm
Occupational therapist	Specialty certification in gerontology is available	Assesses and treats functional, sensory, and perceptual deficits that impact ADLs. Assesses need for assistive devices. Assesses and treats cognitive deficits. Provides rehabilitative services in geropsychiatric services.	• Aging Blueprint: http://www.agingblueprint.org/orgs/aota.cfm • The American Occupational Therapy Association: http://www.aota.org
Pharmacist	PharmD; 4 years beyond prerequisite 2 years National exam NABPLEX State licensure required Certification available as geriatric pharmacist	Prepares and dispenses medication. Provides clinical consultation and education for patient and geriatric team.	• American Society of Consultant Pharmacists: http://www. ascp.com/about/ • Commission for Certification in Geriatric Pharmacy: http://www.ccgp.org
Physical therapist	DPT, transitioning from MPT State exam Specialty certification in gerontology available	Assesses mobility and functional capacity of the elderly. Treatment includes rehabilitation, strengthening, mobility, and use of assistive devices.	• Section on Geriatrics: American Physical Therapy Association: http://geriatricspt.org

(continues)

Table 17-1 DISCIPLINES, EDUCATION, ROLES, AND WEB RESOURCES IN GERONTOLOGY (CONTINUED)

Discipline	Education/Certification Licensure	Role in Gerontology	Web Resources
Physician	Professional doctorate with a degree in allopathic or osteopathic medicine	Dependent on area of residency, specialty focus is on the area/disease process as it relates to aging.	
Physician Assistant	Two-year education, usually post-bachelor's degree State licensure required	Midlevel practitioner	• American Academy of Physician Assistants: http://www.aapa.org
Psychiatrist	Medical degree with residency and board certification in psychiatry State licensure required	Geropsychiatry Evaluates, treats, and manages mental health issues faced by the elderly. Includes pharmacotherapy, evaluation of cognition, and psychotherapy.	• American Association for Geriatric Psychiatry: http://www.aagponline.org
Psychologist	Graduate education, usually at the PhD or PsyD level State licensure required	Geropsychology Assesses, consults, intervenes in, and manages conditions related to adaptation, bereavement, counseling, and treatment for clinical, cognitive, and behavioral needs.	• American Psychology Association Committee on Aging: http://www.apa.org/pi/aging/cona01.html • Clinical Geropsychology Division 12 (APA): http://www.geropsych.org • Psychology of Adult Development and Aging Division 20 (APA): http://apadiv20.phhp.ufl.edu

Registered nurse	Associate's degree, diploma, or bachelor's degree National board exam NCLEX Optional certification in gerontology State licensure required	Assesses, plans, provides, coordinates, and evaluates care, which focuses on health, optimal wellness, disease prevention, and advocacy.	• Geronurse online: http://www.geronurseonline.org • Hartford Geriatric Nurse Initiative: http://www.wajskol.com/client/hgni/index.html • Nurse Competence in Aging: http://www.nursingworld.org/nca/
Social worker	Bachelor's degree in social work (LSW) Master's degree in social work (KMSW) State licensure	Assists with coping and problem solving as individuals and families adjust to and face changes with aging and chronic illness. Provides counseling and psychotherapy.	• Gerontological Social Work: http://www.gitt.org/full_social_work.html • National Association of Social Workers: http://www.naswdc.org • Association of Social Work Boards: http://www.aswb.org/lic_req.shtml
Speech-language pathologist	Master's degree and clinical fellowship (CFY) State licensure	Assesses and treats communication disorders including speech, language, and hearing, as well as swallowing and cognitive deficits.	• American Speech-Language-Hearing Association: http://www.asha.org • ASHA Division 15, Gerontology: http://www.asha.org/about/membership-certification/divs/ div_15.htm
Clinical specialist in gerontological nursing	Master's degree Certification	Provides, directs, and influences care of older adults and families in various settings.	• American Nurses Credentialing Center: www.nursingworld.org/ancc/certification/certs/advprac/cns.htms

Case Study 17-1

Mr. J., an 84-year-old man, has Type 2 diabetes and hypertension. He notices some decrease in his activities of daily living due to unsteadiness on his feet. He is mourning the loss of his wife, who died 6 months ago. His daughter-in-law is concerned about the number of medications he is on and if he is taking them correctly. Mr. J. has been eating frozen dinners and spends most of his days sitting in the front room watching television.

Questions:

1. Who is the correct person for him to see? the physician, the social worker, the registered nurse or nurse practitioner, the pharmacist, the dietician, the physical therapist, or the occupational therapist?
2. Should the physician be an internist, an endocrinologist, a psychiatrist, or a gerontologist?
3. Should Mr. J. see all of these individuals and have multiple evaluations, treatment plans, and follow-up appointments?
4. Which professional should he see first?
5. Is it possible for the different treatment plans to be duplicative or counterproductive to each other?

Box 17-1 Reflections on the Case Study

The assessment team for Mr. J. in the case study may include a geriatrician, gerontological nurse practitioner, social worker, dietician, physical and occupational therapist, pharmacist, and psychologist or psychiatrist. Together they could assess Mr. J. for diabetes control and the presence of peripheral neuropathy, which may be affecting his mobility and rule out a minor stroke given his history of hypertension and diabetes. From that point they could assess his need for physical or occupational therapy for functional mobility. The dietician could analyze his diet and, based on Mr. J.'s diabetes, recommend dietary needs. Depending on the assessment for grieving or depression, recommendations for counseling, medication, or socialization might be needed. Referrals could be made as needed for Meals on Wheels or for some socialization activities at a senior center.

also vital to the focus of the team's work. An example would be a team focused on elder abuse assessment, which may include collaboration with adult protective services (Dyer et al., 1999).

Together the geriatric team can identify needs based on a wide array of assessment parameters. Working together allows the patient to be seen as a whole.

Team Development

Unfortunately, none of the individual professions requires educational coursework or consistent experience in interdisciplinary work. The value of health professionals learning to work in interdisciplinary teams is not limited to gerontology and has become an area of concern and need for all health professionals. In their *Crossing the Quality Chasm* report (2001), the Institute of Medicine (IoM) notes that "effective teams have a culture that fosters openness, collaboration, teamwork, and learning from mistakes" (p. 132). The IoM expanded this to a mandate for interdisciplinary education in its publication, *Health Professions Education: A Bridge to Quality* (Greiner & Knebel, 2003). It notes the need to work in interdisciplinary teams for patient safety and quality care. To do this, professionals need to learn to cooperate, collaborate, communicate, and integrate care in teams to ensure that care is continuous and reliable. Developing core competencies of providing patient-centered care based on current evidence, quality improvement strategies, and informatics through work in interdisciplinary teams is key to effective care (p. 46).

In 1994, the John A. Hartford Foundation began its efforts for geriatric interdisciplinary team training (GITT) by establishing an advisory committee to consider the feasibility for a training program (Hyer, 1998). From that advisory committee a plan was implemented that offered grants to initiate training programs. That initial group of grant programs included students from advanced practice nursing, medicine, occupational therapy, physical therapy, ethics, law, social work, audiology, dentistry, nutrition and dietetics, pharmacy, administration, psychology, pastoral counseling, physician assistants, and speech and language pathology. The target was to expose these health professionals to group interaction, group norms, and growth during their educational process. This initial project has gone beyond the initial education of the participants to the development of a core curriculum in interdisciplinary training (John A. Hartford Foundation, 2001b). **Box 17-2** provides online resources for GITT along with other Web resources.

Another team education model is the **geriatric assessment interdisciplinary team (GAIT)**, funded in Maryland as part of the Geriatric and Gerontology Education and Research Program (GGEAR). This is an elective for students from Maryland schools of medicine, gerontology, psychology, recreation therapy, social work, nursing, physician assistants, speech and language, dental, law, pharmacy, and occupational and physical therapy that includes a series of 2-day rotations between various geriatric programs. The components of the training include a core curriculum as well as experience in working in a team environment. Content related to the professional roles of the various team members, their education, and scope of practice is foundational to working together. The content includes meanings and definitions found in geriatrics. Additional material deals with team-building exercises and roles played within a team, which may or may not reflect the individual's professional role. Finally,

Box 17-2 Geriatric Team Resources

American Geriatric Society
http://www.americangeriatrics.org/education/geristudents/interdisciplinary.shtml

The American Geriatric Society GITT site
http://www.americangeriatrics.org/education/gitt/gitt.shtml

The John A Hartford GITT home page
http://www.gitt.org

The National Council on the Aging
http://www.ncoa.org

Discover Nursing Links
http://www.discovernursing.com/jnj-specialtyID_238-dsc-specialty_detail.aspx

Interdisciplinary Care of Older Adults: A Web-Based Case Project
http://geri-ed.umaryland.edu

the team's forming, storming, norming, and performing phases are shared as a means of understanding the dynamic of a team's developmental process (Siegler et al., 1998).

Teams in geriatrics are usually focused on assessment, consultation, or management. **Geriatric assessment teams (GATs)** or geriatric consultation teams vary with the purpose of the consultation and may occur in an inpatient or outpatient setting. For example, if the team focuses on dementia or Alzheimer's assessment there may be members who can evaluate other causes of confusion, ascertain cognitive function, or identify stages of the disease process and the potential resources available to the individual. If the team is focused on functional assessment, the emphasis may be on activities of daily living, home assessment, and the etiology of the functional changes. Geriatric teams are frequently called in to evaluate "functional, social, fall risk, nutrition, medication, depression, cognition, and incontinence" problems (Dellasega, Salerno, Lacko, & Wasser, 2001, p. 202).

In a metaanalysis of multidisciplinary geriatric consultation, Agostini, Baker, Inouye, & Bogardus (2001) noted that fewer than half of all hospitals offer comprehensive geriatric assessment. These consultation teams provide services throughout the hospital to the attending physician. Unfortunately, these services are requested for only a small number of the hospitalized elderly. The recommendation from the analysis is that further study is needed to identify the potential effect of geriatric consultation, especially in the area of functional loss due to hospitalization.

There are also treatment and management teams, which may occur in the inpatient or outpatient setting. In the inpatient setting, if there are designated units, these are often referred to as inpatient **geriatric evaluation and**

management (GEM) units. Another term used is **acute care for elders (ACE)** units. In GEM and ACE units, patients are admitted to the geriatric service and the unit is staffed with geriatric team members. Studies to date have not provided statistical differences in outcomes, although the literature is limited. Agostini, Baker, & Bogardus (2001) do note there were indications of increased likelihood of discharge home in the studies reviewed.

Challenges and Benefits

The challenges begin with the reality that each professional discipline has been educated to think in a specific way. That socialization rarely includes the expectation to work within an interdisciplinary team. The move into a team role means a blur in roles and in some long-held norms. Only nursing and social work are noted to have a history of collaboration (Reuben et al., 2004). Most of the professionals are used to being dependent on physician orders. This experience, as well as the physician's experience of writing orders, may impact the manner in which a team initially works together. The lack of understanding about each other's professional education, roles, and scope of practice can lead to unrealistic or limited expectations. All these issues need to be part of the initial work as a team comes together.

Although there have been training programs as well as curricula, the initial work has been done with students working in teams. Implementing geriatric teams in the work setting requires an investment in time to develop a team and work through a team building effort. It is likely that professionals have not had experience or training in working in an interdisciplinary team. The bottom line is also an issue. There is no real funding or reimbursement for team development. This requires institutional as well as professional commitment (Reuben et al., 2003).

There may even be regulatory and accreditation barriers that do not recognize team structures. Administrators or the team itself may continue to look at the silo approach to care. Reimbursement is another issue. Not all disciplines can bill for services, but these disciplines may be key to providing a comprehensive assessment.

Finally there is the issue of shared power. This is an issue within the team because as mentioned earlier, professional norms indicate who writes orders and who follows them. This is also an issue when power is shared with the patient. In an interdisciplinary team, the patient or caregiver is an equal member of the team and is expected to participate in the goal setting and planning for their own care. The role of the patient as expert is not one common in this country and may cause dissonance for some professionals.

The benefits of geriatric teams center around the potential benefit for the elderly as they receive patient-centered assessment and interventions that take the whole person, the context in which they find themselves, and their presenting concerns into consideration. Because the professionals on a geriatric team have advanced knowledge of aging, chronic illness, and disease as well as functional loss prevention, the elderly receive a comprehensive approach to their care. Satisfaction is increased through the inclusion of the patient or caregiver in the assessment as well as the planning and goal setting. Care is viewed as more respectful when the patient's values, impressions, and preferences are included in the process (Greiner & Knebel, 2003). The quality of care is increased by the inclusion

of evidence from a number of different professional perspectives as part of the assessment and treatment process. In general, it is more cost effective to provide care using a geriatric team because there is less redundancy in the services provided and the team has representatives that view the presenting issues from a multitude of perspectives at the same time (Vazarini et al., 2005).

From a professional standpoint, the benefits include shared values, goals, and responsibilities for the care of the elderly. The opportunity to work together and learn from one another has the potential to allow team members to grow. Another advantage to working in teams is the development of new skills in communication, conflict resolution, cooperation, and time management as one gains comfort working within a team.

The potential for time saving and increased productivity are also part of a team effort. The time saving relates not only to the patient, but also to the professional who does not need to wait for consultations, avoids duplication of assessment information, and maintains an understanding of what resources are available within the team. An increase in productivity occurs through team meetings, versus individual contacts, with all involved in the assessment or treatment of a patient.

In general, once the investment is made in the team concept, there is great opportunity for professional growth. The potential for collaboration in planning, decision making, problem solving, and goal setting has great promise in health care (Gardner, 2005; Greiner & Knebel, 2003). Geriatric interdisciplinary teams offer the most effective way to meet the needs of the elderly in all settings (**Box 17-3**).

Box 17-3 Research Highlight

Aim: The purpose of this study was to evaluate the changes in function and self-efficacy that may occur in a group of older hospitalized patients admitted to a geriatric rehabilitation unit.

Methods: Data was collected on 40 patients (age 65–101 years, with a mean age of 83.8) who were admitted to an interdisciplinary geriatric rehabilitation unit. The subjects were living independently prior to admission.

Findings: Improvement in self-efficacy and functional level (as measured by the FIM scale) was statistically significant. Most of the subjects were able to return to living in the community.

Conclusion: The effects of interventions by an interdisciplinary team that specializes in geriatrics can positively affect older persons' feelings of independence, ability to care for themselves, and functional progress. Units that specialize in the rehabilitation of older persons and utilize a team approach with a variety of disciplines may uniquely impact elders' ability to return home after discharge.

Source: McCloskey, R. (2004). Issues and innovations in nursing practice: Functional and self-efficacy changes of patients admitted to a geriatric rehabilitation unit. *Journal of Advanced Nursing, 46*(2), 186–189.

Critical Thinking Exercises

1. If an older person is having difficulty with home maintenance skills such as eating or using the laundry facilities, which team member would best address this?
2. For a person having gait problems, which team member could the nurse go to for advice and assistance?
3. If an individual with aphasia wishes to improve his speech, which team member will be working closely with him?
4. The person with a tube feeding who is not tolerating the formula well might benefit from the nurse and which other team member when discussing this problem?

Personal Reflection

1. Have you ever worked with a team in any area? Have you ever worked with an interdisciplinary team in a health care setting? If so, how did you feel about that experience? If not, have you ever observed such a team in action? Which of the team members are you most familiar with? How important to you in your future career is the opportunity to work within a well-functioning team?
2. If you were assigned to work on an ACE, what differences would you expect to see compared to a general medical-surgical unit? What types of backgrounds, educational levels, or experiences would team members likely have?

Glossary

Acute care for elders (ACE) unit: A specialized hospital-based unit providing interdisciplinary acute care for older adults

Geriatric assessment interdisciplinary team (GAIT): An interdisciplinary training model developed in Maryland as an elective for students from various health care disciplines

Geriatric assessment team (GAT): Interdisciplinary team of professionals specializing in assessment of the elderly

Geriatric evaluation and management (GEM): Defined inpatient units or services where the elderly are assessed and treated

Geriatric interdisciplinary team training (GITT): An organized training program for professionals of various disciplines focused on learning about working in teams and the use of teams in gerontology

Interdisciplinary team: A team in which members of various disciplines interact, collaborate, and work together for common goals

Multidisciplinary team: A team made up of members of various disciplines

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Chapter 18

Alternative Health Modalities

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LEARNING OBJECTIVES

At the end of this chapter, the reader will be able to:

1. Explain what constitutes CAM.
2. Identify each classification of CAM.
3. Discuss nursing interventions associated with the most popular herbal products.
4. Compare the benefits and drawbacks for the diets identified under biologically based therapies.
5. Distinguish the differences between veritable and putative energy fields.
6. Discuss why older adults may use CAM.
7. Contrast Ayurveda and traditional Chinese medicine (TCM) systems.

KEY TERMS

- Ayurveda
- Biofeedback
- Biologically based therapy
- Chiropractic practice
- Dosha
- Guided imagery
- Homeopathy
- Meditation
- Mind–body interventions
- Naturopathic medicine
- Pet-assisted therapy
- Putative energy field
- Qi (chi)
- Sound energy therapy
- Traditional Chinese medicine (TCM)
- Veritable energy field
- Yang
- Yin

The use of complementary and alternative medicine (CAM) has been steadily increasing in both the United States and worldwide (Barnes, Powell-Griner, McFann, & Nahin, 2004; Bielory, 2002; Eisenberg et al., 1998; Milden & Stokols, 2004). Even though age does not seem to be a predictor of CAM use, one study identified that 35% of those over 64 years of age surveyed used CAM. This figure is consistent with Eisenberg et al.'s study (1998).

What Is Complementary and Alternative Medicine?

According to the National Center for Complementary and Alternative Medicine (NCCAM), CAM "is a group of diverse medical and health care systems, practices, and products that are not presently considered part of conventional medicine" in the United States (National Center for Complementary and Alternative Medicine [NCCAM], 2002). In their classic article on unconventional medicine in the United States, Eisenberg et al. (1993) defined unconventional or alternative therapies as "medical interventions not taught widely at U.S. medical schools or generally available at U.S. hospitals (p. 246)." Although considered alternative or complementary in the United States, many of the modalities under this umbrella term are considered mainstream medicine in other countries (Bielory, 2002). In addition, what is considered complementary or alternative today may be considered a mainstream modality in 10 years. The focus of CAM therapies is on maintaining and promoting health.

Classifications of CAM

The National Center for Complementary and Alternative Medicine classifies CAM into five domains: (1) alternative medical systems, (2) **mind–body interventions**, (3) **biologically based therapies**, (4) manipulative and body-based methods, and (5) energy therapies.

Alternative Medical Systems

Alternative medical systems are those systems that originated in the United States before allopathic medicine. Examples are homeopathic medicine and naturopathic medicine. **Homeopathy** originated with German physician Dr. Samuel Hahnemann's natural law of "like cures like" or the Principle of Similars (Kuhn, 1999; Rosser, 2004). Homeopathy remedies are prepared by diluting certain substances and then gradually increasing the dilution until no actual measurement of the original substance exists. Although there are no active ingredients in a homeopathic solution, it helps the body to begin to heal itself using its own defense mechanisms. Homeopathic remedies are recognized and regulated by the Food and Drug Administration (FDA). Remedies are also listed in the *Homeopathy Pharmacopoeia of the United States*. According to Kuhn, homeopathic remedies enhance healing without harmful side effects.

Homeopathy has been used to treat illnesses such as respiratory infections, headaches, ear infections, neck stiffness, postoperative infections, dental pain, flu, motion sickness, and general aches and pains as well as sprains, bruises, and burns (Kuhn, 1999). Homeopathy is not as effective as allopathy in emergencies.

Naturopathic medicine focuses on keeping the person healthy. It encompasses a variety of

healing practices, including diet and nutrition, homeopathy, spine and soft tissue manipulation, acupuncture and acupressure, herbs, exercise, counseling, and light therapy (Kuhn, 1999). In naturopathy, if the body is supported and barriers to cure are removed, the body will heal itself. There are minimal risks to naturopathic medicine, but natural healing may take longer than traditional allopathic medicine. Therefore, symptoms may last longer before they are eradicated.

Traditional medical systems of non-Western cultures are also included under this category of CAM. **Ayurveda** and **Traditional Chinese Medicine (TCM)** are examples of these systems. Ayurveda dates to 4500 B.C. and is rooted in the ancient Hindu medical texts called *Vedas* (Gormley, 2000). Sanskrit for "knowledge or science of life," Ayurveda is a comprehensive system that encompasses the body, mind, and consciousness connection and seeks to restore a person's harmony or balance. It emphasizes prevention and encourages maintaining health. Ayurveda includes geriatrics as one of eight medical divisions. Practices in Ayurveda medicine include (1) diet, (2) exercise, (3) meditation, (4) herbs, (5) massage, (6) exposure to sunlight, (7) controlled breathing, and (8) detoxification (Pohl, 2001). According to Ayurveda, five elements make up all things: (1) space or ether, (2) air, (3) fire, (4) water, and (5) earth. These elements are not static, but rather always in flux. In addition to the five elements, Ayurveda identifies three types of energy, or **doshas**. Vata is the energy of movements and comes from ether and air. Pitta is the energy of digestion and comes from fire and water, and kapha comes from water and earth and is the energy of lubrication and structure, which keeps the cellular body together (Gormley; Pohl). Each person has a unique energy pattern. Disease is caused by an imbalance in the body, or disorder. Diagnosis is made through symptomatology rather than through traditional laboratory diagnostics. The goal of treatment is to bring the body into balance. Although the Ayurvedic physician has many treatments available, most of the research evaluated by the Agency for Healthcare Research and Quality (AHRQ) focused on herbal remedies (Southern California Evidence-Based Practice Center, 2001).

Traditional Chinese medicine (TCM) dates back in written form to 200 B.C. Korea, Japan, and Vietnam all have medical systems based on the traditional medical systems in China. TCM includes the therapies of acupuncture, herbal medicine, massage, and meditation. According to TCM, the body is a balance of two opposing forces: **yin** and **yang**. Yin represents the cold, slow, darkness, or passive principle, usually considered the female aspect. Yang, on the other hand, simulates fire and is the hot, excited, active principle, usually considered the male aspect. In this tradition of medicine, health is balance. Disease is seen as an imbalance between yin and yang; this imbalance impedes the flow of vital energy (**qi or chi**) and blood along pathways called meridians (NCCAM, 2004d). The system of qi forms the basis for diagnosis and treatment of illness as well as for promoting health and preventing illness (Chen, 2001). Diagnosis of disharmony is made on the basis of the patient's complaints and report of the experience of being sick (Fan, 2003) and evaluation of the quality of the pulse at nine particular points in the body, as well as the appearance of the tongue.

Acupuncture, an integral part of TCM, for example, promotes the flow of qi (chi) along the meridians, those pathways throughout the body

that vital energy flows through. Acupuncture is the insertion of very thin, solid, metallic needles at the appropriate point on the affected meridian. There is no comparison in allopathic medicine. Acupuncture has been studied and there is evidence to support its efficacy, particularly in the area of pain management. Acupuncture releases endogenous opioids, the same mechanism behind the use of transcutaneous electrical nerve stimulation (TENS) (Gloth, 2001).

Acupuncture is one of the treatments used in CAM. According to TCM, acupuncture corrects the flow of qi through the body, which helps restore the body's balance. Acupuncture is widely used in the United States, and research has shown its efficacy in treating adult postoperative and chemotherapy nausea and vomiting and postoperative dental pain. Promising results have been shown in the treatment of headache, stroke rehabilitation, osteoarthritis, low back pain, carpel tunnel syndrome, and asthma, but more research needs to be done to support the efficacy of acupuncture in treating these syndromes (NIH Consensus Development Panel on Acupuncture, 1998).

Qi gong is widely practiced in Chinese hospitals and clinics, but there have been no large clinical trials outside China to support this practice. Qi gong refers to exercises that improve health and increase a sense of harmony. It is the practice of manipulating qi (chi) through movement and meditation.

Mind–Body Interventions

Mind–body interventions are among the most widely used of the complementary/alternative modalities (Barnes et al., 2004). Among the therapies included in this category are prayer, deep breathing, meditation, yoga, biofeedback, tai chi, and guided imagery (**Table 18-1**). Other modalities that would fit under this category are pet therapy and music therapy. Mind–body interventions acknowledge that emotional, mental, social, spiritual, and behavioral factors can directly affect health (NCCAM, 2004c). The mind–body connection entails two physiological pathways that involve the nervous, immune, and endocrine systems (Maier-Lorentz, 2004). The sympathetic-adrenal-medullary (SAM) pathway activates the autonomic nervous system; neurotransmitters and neuropeptides communicate with the immune cells. The hypothalamic-pituitary-adrenal (HPA) pathway signals the endocrine system to release hormones, particularly thyroid and adrenal hormones, which have a direct effect on the immune system (Maier-Lorentz). The impact of stressors and hormones on the immune system is discussed in Chapter 6.

Several of the mind–body interventions have their roots in religious traditions. Prayer is the

Table 18-1 Most Identified CAM Mind–Body Therapies

Ranked by Reported Use	
Prayed for own health	52.1%
Others ever prayed for your health	31.3
Participate in a prayer group	23.0
Deep breathing exercises	14.6
Meditation	10.2
Yoga	7.5
Healing ritual for own health	4.6
Progressive relaxation	4.2
Guided imagery	3.0
Tai chi	2.5
Hypothesis	1.8
Energy healing therapy (Reiki)	1.1
Biofeedback	1.0
Qi gong	0.5

Source: Barnes, P. M., Powell-Griner, E., McFann, K., & Nahin, R. L. (2004). *CDC Advance data report # 343. Complementary and alternative medicine use among adults: United States, 2002.* Hyattsville, MD: National Center for Health Statistics.

most widely used CAM. In a report released by the National Center for Health Statistics, 45% of the adults surveyed in 2002 had used prayer for health or spiritual healing during the past 12 months (Barnes et al., 2004). Belief in God or a higher being is not required for prayer to occur because prayer may be defined as turning one's heart and mind to the sacred (Ameling, 2000). Some researchers and practitioners support the belief that prayer facilitates healing (Dossey, 1993; Byrd, 1988). Although prayer is widely used and accepted, research studies supporting the value of prayer and healing have led to inconclusive results (Gundersen, 2000; Maier-Lorentz, 2004; Sending Prayers, 2002; Sicher, Targ, Moore, & Smith, 1998). Difficulties in methods, including treating prayer, religion, and spirituality as the same concept, may be responsible for some of the mixed results (Gundersen; Maier-Lorentz). **Meditation** is closely related to prayer; it is a conscious process that induces the relaxation response (NCCAM, 2004c). There are two types of meditation. In concentrative meditation, the individual focuses on a mantra, sound, or visual image and is able to quiet the mind by concentrating on this focal point. The second type of meditation, mindfulness or vipassana meditation, begins with the individual focusing on breathing and continues until the individual develops a nonjudgmental awareness of the present. Meditation can be practiced by individuals of all ages and has been used to reduce stress, promote relaxation, and remove pain from the main focus of an individual's mind (Ott, 2004; Roberts, 2004).

The practice of yoga, which has its roots in India, integrates physical, mental, and spiritual health so the individual can be in harmony with the universe. There are different schools of yoga and each has a different focus, but basically yoga combines disciplined breathing, defined gestures, and specific postures (*asanas*) to achieve a sense of harmony. Studies have supported the benefits of yoga for a wide variety of medical conditions and a wide variety of ages (Raub, 2002).

Imagery is any perception that comes through the senses (Naparstek, 1994). Sights, sounds, smells, or tastes can be used to create mental images to aid in relaxation and manage physical symptoms or stress and anxiety. These created mental images, called **guided imagery**, are considered a powerful self-help technique that is easy to learn and can be used by individuals of all ages (Menzies & Taylor, 2004; Miller, 2003).

Biofeedback is now used in traditional therapies as well as complementary and alternative therapies. An individual uses machines to receive information about bodily functions such as skin temperature, brain waves (electroencephalography [EEG]), breathing, blood pressure, and heart rate. The individual receives information about the function in the form of audible or visual signals and is trained to focus on controlling the targeted bodily function. Reinforcement is received through feedback from the audible or visual signals. With practice, the individual becomes more skilled at controlling the targeted function. Eventually, the individual can control the function without the use of the machine to provide feedback. Studies have demonstrated that biofeedback has been used successfully to control a variety of symptoms such as headaches, chronic pain, hot flashes, and incontinence (Kuhn, 1999).

Another mind–body therapy not listed in the NCCAM categories is **pet-assisted therapy**, or pet-assisted visitation. Pet-assisted therapy and visitation is gaining in popularity, especially with children and older adults. A variety of animals (dogs, cats, horses, and rabbits) have been used to decrease stress and increase feelings of well-being. Although sometimes the terms are used synonymously, animal-assisted therapy is

different from animal-assisted visitation. In animal-assisted visitation, certified therapy animals visit patients and families in a common room or at the bedside. A trained professional, on the other hand, performs animal-assisted therapy (Stanley-Hermanns & Miller, 2002). Research studies tend to support the effectiveness of pet-assisted visitation and therapy (Hooker, Freeman, & Stewart, 2002; Stanley-Hermanns & Miller). To initiate a pet therapy or visitation program, disease prevention strategies must be undertaken. Animals must be examined by a veterinarian to make sure they are free of any disease or parasites and are up to date on vaccinations. Animals should be bathed within 24 hours before visiting and should be under the handler's control at all times (Stanley-Hermanns & Miller).

Biologically Based Therapies

In CAM, biologically based therapies include those substances found in nature, including herbs, vitamins, foods (including dietary supplements), and other natural but scientifically unproven therapies such as elk horn and shark cartilage (NCCAM, 2002). Vegetarian, macrobiotic, Atkins, Pritikin, Ornish, and Zone are examples of diets included under this category (Table 18-2). Chelation therapy and folk med-

Table 18-2 POPULAR DIETS LISTED UNDER BIOLOGICALLY BASED THERAPIES

Diet	Description
Atkins	Diet emphasizes low carbohydrates (40 grams or less daily) with an increase in fat and protein (Barnes et al., 2004).
Macrobiotic	Low-fat diet emphasizes whole grains and vegetables and a decrease in fluid intake. Meat, dairy products, eggs, alcohol, sugar, sweets, coffee, and caffeinated teas are avoided.
Ornish	High-fiber, low-fat vegetarian diet; promotes weight loss by restricting the types of food rather than calories.
Pritikin	Low-fat (10% or less) diet emphasizes consumption of foods with a large volume of fiber and water (low in calorie density). Diet includes many vegetables, fruits, beans, and unprocessed grains.
Zone	Each meal consists of 30% low-fat protein, 30% fat, and 40% fiber-rich fruits and vegetables. The goal of this diet is to control key hormone production to alter metabolism.
Vegetarian	A diet that excludes meat, fish, fowl, or products containing these foods.
Lacto-ovo vegetarian	Diet is based on grains, vegetables, fruit, seeds, nuts, legumes, dairy products, and eggs. It excludes meat, fish, and fowl.
Lacto vegetarian	Diet excludes eggs, meat, fish, and fowl, but includes dairy products.
Vegan vegetarian	Diet excludes dairy, eggs, meat, fish, fowl, and other animal products.

Source: Mangels, Messina, & Melina, 2003.

icine also fit under this category. According to Barnes et al. (2004) nearly 19% of adults who used complementary and alternative medicine within the past year used nonvitamin and natural products; nearly 3.5% used diet therapies. Because this category includes natural products, individuals, particularly the elderly, may have the mistaken belief that there are no side effects or concerns in using these products. However, caution must be taken in using these products with certain prescribed medications.

Table 18-3 displays the 10 natural products used most often by those who used complementary and alternate medicine in the year preceding the national survey. In addition to the widely used herbal supplements in Table 18-3, other herbs are frequently used. Valerian root is used as a sedative and sleep aid. It should not be used in conjunction with alcohol, sedatives, or anti-anxiety medication. Side effects include mild headache or upset stomach; it is not addictive. Kava Kava (Piper methysticum) has been

Table 18-3 Ten Most Often Used Natural Products

Name	Actions/Use	Contraindications/Side Effects
Echinacea purpurea (Echinacea)	Anti-infective; stimulates immune response *Uses:* treatment and prevention of coughs, colds, and flu	May interfere with immunosuppressant drugs; contraindicated in diseases related to the immune response: multiple sclerosis, tuberculosis, AIDS, autoimmune diseases. Should not be used for more than 8-week intervals or immune system may be depressed. (Deglin & Vallerand, 2005)
Panax ginseng (Asian ginseng) Panax quinquefolius (American ginseng)	Analgesic; antiestrogen-like effects *Uses:* improvement of mental and physical status; treatment of diabetes; aphrodisiac	May decrease effectiveness of warfarin; may interfere with MAO inhibitors; may have hypoglycemic effects; caffeine may increase herb effect. *Side effects:* agitation, insomnia, tachycardia, depression, hypertension (Deglin & Vallerand).
Gingko biloba (Gingko) Standardized: 24% flavonoid glycosides 6% terpene lactones	Antioxidant; inhibits platelet-activating factor *Uses:* correcting cerebral insufficiency	Use with caution if individuals are on anticoagulant or antiplatelet therapy or have diabetes. Contraindicated if individuals have bleeding disorders or increased blood sugars. *Side effects:* headache, dizziness, GI disturbances.

(continues)

Table 18-3 Ten Most Often Used Natural Products (continued)

Name	Actions/Use	Contraindications/Side Effects
Garlic supplements	Vasodilator, antiplatelet properties *Uses:* Reducing hypertension, lowering cholesterol	May increase bleeding; not as effective in lowering cholesterol as other medications. (Deglin & Vallerand)
Glucosamine	May stimulate cartilage growth *Uses:* Treating osteoarthritis	Contraindicated if shellfish allergy present. May interfere with glucose regulation in diabetics. (Deglin & Vallerand)
St. John's wort (Hypericum perforatum)	Antidepressant; when used topically, may have antiviral, anti-inflammatory, antibacterial activity *Uses:* Treatment of mild to moderate depression	Alcohol and other antidepressives may increase CNS side effects. *Side effects:* dizziness, restlessness, sleep disturbance, hypertension, bloating, abdominal pain, flatulence. (Deglin & Vallerand)
Peppermint	Muscle relaxant, particularly in the digestive tract; reduces inflammation in nasal passages *Uses:* Treatment of irritable bowel syndrome, nausea and vomiting, congestion related to colds and allergies	May cause choking feeling if applied to chest or nostrils of a child under 5; may intensify symptoms in hiatal hernia; avoid large dose if pregnant because it can relax uterine muscles. *Side effects:* none identified. (Whole Health MD, 2005)
Fish oils/omega fatty acids	May decrease risk of coronary artery disease; may protect against irregular heart heartbeats *Uses:* protection against heart disease	None
Ginger supplements	Antiemetic; inhibits platelets and prostaglandins; improves digestion and appetite; may be hypoglycemic *Uses:* Prevention of nausea and vomiting; easing of joint pain	Use with caution in patients with bleeding tendencies or on anticoagulant therapy or with diabetics. *Side effects:* heartburn.
Soy supplements	Lowers total cholesterol and low-density lipoprotein (LDL) *Uses:* to lower high colesterol	Controversy that isoflavones, a component of soy, are phytoestrogens, a weak estrogen, and may increase cancer risk; other evidence supports that soy may protect against breast cancer. (Henkel, 2000)

shown to relax skeletal muscles. It is used for anxiety, stress, restlessness, and insomnia. Its use is contraindicated in individuals with liver disease or depression. It should not be used with anti-depressives, alcohol, or tranquilizers. Side effects include dizziness, headache, drowsiness, and hepatic toxicity (Deglin & Vallerand, 2005; Ernst, 2002). Saw palmetto has been used for treating benign prostatic hyperplasia (BPH), and studies have supported its efficacy (Ernst, 2002; Gordon & Shaughnessy, 2003). Side effects include mild gastrointestinal upset; there are no reported drug interactions. The biggest concern about the use of saw palmetto is that individuals may self-medicate without verifying the diagnosis of BPH, and, therefore, more serious diseases of the prostate could be missed. Capsaicin, derived from hot peppers, is used topically to relieve pain from neuralgias and osteoarthritis and rheumatoid arthritis. Capsaicin produces a stinging or burning sensation when initially used. Clients should be instructed to keep capsaicin away from the eyes and other sensitive areas of the body (Medline Plus, 2005).

Even though herbs are natural products, some herbal medications have side effects that could have adverse effects for the elderly. Yohimbe is used to treat impotence. Although it has been shown to be effective, it is not recommended by the FDA. When combined with tricyclic antidepressants, side effects include hypertension, renal failure, seizures, hypotension, tachycardia, and dizziness. Comfrey is used for gastritis, gastrointestinal ulcers, rheumatism, bronchitis, internal bleeding, diarrhea, and sprains and pulled ligaments. Because of the potential side effect of liver toxicity when ingested, the FDA has identified comfrey as a possible health hazard; however, the hazard is significantly less when used as a compress. The FDA also proposed a limit to the amount of ephedrine alkaloids in dietary supplements (ephedra, Ma Huang, Chinese ephedra). The use of ephedrine has been linked with nervousness, dizziness, heart attack, stroke, seizures, and death (An FDA Guide, 2004). Consumers must be instructed to read labels because ephedrine may be an ingredient on supplements imported from other countries. Ginko, commonly used for memory improvement, affects clotting time. There are many potential cardiac side effects and interaction with herbal medications.

Although most of the herbal medications are safe when used as recommended, the concern is that many older adults do not tell their nurse practitioners, physicians, or other health care providers about the herbal medications they are taking. This increases the possibility of drug interactions (Astin, Pelletier, Marie, & Haskell, 2000). Also, many times health providers do not ask their patients about what natural substances they are taking (Milden & Stokols, 2004). Patients taking prescription drugs such as blood thinners, blood pressure medications, cyclosporine, digoxin, hypoglycemic agents, phenytoin, theophylline, and antidepressants should avoid herbal medications (Kuhn, 2002; Williamson, Fletcher, & Dawson, 2003). In addition, many safety concerns and drug interactions are underresearched in the elderly. Consumers should be cautioned when using herbal remedies to buy only reputable products, as the FDA does not regulate herb manufacturing (**Case Study 18-1**).

Manipulation and Body-Based Practices

Manipulation and body-based practices primarily focus on the structures and systems of the body. These practices are not new; some are rooted in traditional medical systems and others have

Case Study 18-1

Mr. Walters, 85, is receiving home care following a hospitalization for an exacerbation of congestive heart failure (CHF). He is diagnosed with atrial fibrillation and peripheral vascular disease. His legs are dry with scales; they are discolored from mid-calf to the foot. Both feet are warm to the touch. He was sent home on oxygen at 3 liters with an oxygen concentrator. He is taking the following medications:

- Lanoxin, 0.125 mg every day
- Enteric-coated aspirin, 325 mg daily
- Enalapril, 25 mg twice a day
- Furosemide, 40 mg each morning
- Vitamin E, 400 IU every day
- Ginkgo biloba, 120-mg leaf extract twice a day
- Panax ginseng, 200 mg every day
- Capsaicin to his back and legs when he has been working in the garden

Questions:

1. What assessments would the home health nurse make during home visits?
2. What instructions should Mr. Walters receive from the nurse?
3. What would be appropriate follow-up for the next visit?
4. Why might Mr. Walters be taking some of the supplements listed?
5. Are there any potential interactions of which the nurse should be aware?

been practiced in the United States for over 150 years. Those practitioners of manipulation and body-based practices believe that parts of the body are interdependent and the body has the ability to heal itself. Chiropractic and osteopathic manipulation, massage therapy, reflexology, and rolfing are examples of practices from this category (NCCAM, 2000b). Both chiropractic care and massage were among the 10 most used CAM therapies (Barnes et al., 2004).

Chiropractic practice is considered a holistic approach to health. It is thought to provide benefit by helping place the body in proper alignment. Many third-party payers for health care provide some reimbursement for chiropractic care. Although satisfaction with chiropractic care is high (Hertzman-Miller, 2002; NCCAM, 2000b), empirical evidence about the long-term efficacy is mixed (Bove & Nilsson, 1998; Cherkin, Sherman, Deyo, & Shekelle, 2003; Ernst & Canter, 2003; NCCAM, 2000b).

Massage therapy includes various techniques that involve the manipulation of soft tissue through pressure and movement. Massage promotes circulation of blood and lymph, stimulates nerve endings, increases nutrients to the tissues, and removes waste products (Mitzel-Wilkinson, 2000). Many individuals use massage therapy to increase relaxation and reduce stress, to recover from muscle stress and strain, and to heal injuries.

Satisfaction with massage treatments is very high (NCCAM, 2000b). Although massage is considered a low-risk intervention, it is contraindicated under several circumstances including deep vein thrombosis, burns, skin infections, eczema, open wounds, bone fractures, and advanced osteoporosis (NCCAM, 2000b).

Energy Medicine

Energy medicine encompasses two basic types of energy fields: veritable, which can be measured, and putative, which currently cannot be measured. Examples of **veritable energy fields** include mechanical vibration and electromagnetic forces. **Putative energy fields** (biofields) include the vital energy (qi or chi) of TCM or doshas in Ayurvedic medicine. These forces currently cannot be measured, but therapists claim they work with this energy to improve health by reducing pain and anxiety, increasing wound healing, and providing a sense of well-being. (NCCAM, 2004a). Examples of practices using putative energy fields include Reiki, qi gong, healing (or therapeutic) touch, and prayer for the health of others (intercessory prayer). As a group, these are the most controversial CAM practices because the energy fields cannot be measured, making traditional scientific research methodology difficult.

In addition, several modalities considered under this category could also be included under other categories of CAM, such as traditional medical systems. This can add some confusion to the CAM categories and, consequently, to consumers. It also illustrates that many of the CAM modalities cannot be investigated in isolation, but, rather, must be studied within the larger context.

Therapeutic touch, healing touch, and Reiki all involve movement of a practitioner's hands over the patient's body to balance energy fields (NCCAM, 2004a). Reiki is a form of healing through the manipulation of ki (Japanese for life energy; similar to Chinese qi). There is anecdotal and small study support for these modalities.

Several electromagnetic fields, part of veritable energy medicine, have been used in conventional medicine. Magnetic resonance imagery, cardiac pacemakers, transcutaneous electrical nerve stimulators (TENs), and radiation therapy are all examples of energy usage. Other veritable energy modalities include magnetic therapy, which is the use of static magnets to relieve pain or increase energy levels. Anecdotal reports support the efficacy of static magnets, but more scientific research is needed to support this therapy (NCCAM, 2004a).

Sound energy therapy includes music therapy. The basis of sound energy therapy is that specific sound frequencies can facilitate the body's healing (NCCAM, 2004a). Literature supporting music therapy is mixed, depending on the type of music and patient care setting (Gagner-Tjellesen & Yurkovich, 2001; Wong, Lopez-Nahas, & Molassiotis, 2001). Many times, music therapy is combined with guided imagery to help reduce pain and anxiety. This is an example of the overlap between energy and mind–body modalities.

Light therapy has been used to treat seasonal affective disorder successfully, but other uses do not have as much empirical support (NCCAM, 2004a). This is an area for further research.

Reasons for CAM Use

Older adults use CAM for pain relief, to increase quality of life, and to maintain health and fitness (Astin et al., 2000; Williamson et al., 2003). Some view CAM as a return to a "kinder and gentler medicine" (Barrett et al., 2004); however, most use CAM in combination with conventional medication rather than as a primary source of treatment (Barnes et al., 2004; Bausell, Lee, & Berman, 2001), and most rely on

family and friends to provide information about choosing a modality (Najm, Reinsch, Hoehler, & Tobis, 2003). As a rule, elders choose CAM because of the belief system behind the modality, not because they are dissatisfied with conventional care (Smith, 2004). However, the nurse cannot overlook the fact the some elders may use CAM because they may have difficulty accessing traditional medical care or medications (Pagan & Pauly, 2005) (Box 18-1).

Nursing Interventions

As CAM becomes more widely used by the elderly as well as by the general population, the nurse has a responsibility to be knowledgeable about the modalities clients may be using. The World Health Organization (WHO) estimates that 80% of the world's population uses some form of CAM (Bielory, 2002; Milden & Stokols, 2004), so knowledge about CAM may be considered part of culturally competent care (Cuellar, Cahill, Ford, & Aycock, 2003). When performing assessments, nurses must ask clients about their use of CAM, why particular modalities are used, the source of the therapy, and their knowledge of side effects (King, Pettigrew, & Reed, 2000). These questions should be phrased in a nonjudgmental manner and should in such a way as to cover the variety of modalities. Clients may not

Box 18-1 Resource List

General

Institute of Medicine Board: Health Promotion and Disease Prevention. (2005). *Use of complementary and alternative medicine (CAM) by the American Public*. Washington, DC: Author.

National Center for Complementary and Alternative Medicine (NCCAM): http://nccam.nih.gov

Rosenthal Center at Columbia Medical School: http://www.rosenthal.hs.columbia.edu/Databases.html

University of Pittsburg—The Alternative Medicine Homepage: www.pitt.edu/~cbw/altm.html

Diet and Herbs

Alternative Medicine Foundation: www.amfoundation.org

Blumenthal, M. (Ed.). (1998). *The complete German commission E monographs: Therapeutic guide to herbal medicines*. Austin, TX: American Botanical Council.

Herb Research Foundation: www.herbs.org

Office of Dietary Supplements at the National Institutes of Health: https://ods.od.nih.gov

Pet Therapy

Delta Society: www.deltasociety.org

Therapet Animal Assisted Therapy Foundation: www.therapet.com

Therapeutic Touch

www.healingtouch.net

www.therapeutic-touch.org

acknowledge they are taking herbal medicines, but may identify that they are taking natural products. This is particularly important when clients are on prescribed medications for blood thinning, blood pressure, depression, anxiety, and insomnia. Also, elders may not consider vitamins or minerals as medications because they are considered dietary supplements; however, if taken in conjunction with some prescribed medications or in large doses, vitamins may interfere with the actions of the medications and produce side effects. Good communication skills are key to a thorough assessment of CAM use. Integrated care, a combination of allopathy and CAM, may be the best model of care for an older adult. Many health care professions include CAM courses in the curriculum. The nurse must be a knowledgeable member of this integrated health care team to be able to provide comprehensive, holistic care (Killinger, Morley, Kettner, & Kauric, 2001) (Box 18-2).

Box 18-2 Recommended Readings

Adams, L. L., Gatchel, R. J., & Gentry, C. (2001). Complementary and alternative medicine: Applications and implications for cognitive functioning in elderly populations. *Alternative Therapies in Health and Medicine, 7*(2), 52–61.

Astin, J. A. (1998). Why patients use alternative medicine: Results of a national study. *The Journal of the American Medical Association, 279*, 1548–1553.

Barrett, B. (2003). Alternative, complementary, and conventional medicine: Is integration upon us? *The Journal of Alternative and Complementary Medicine, 9*, 417–427.

Birch, S., Hesselink, J. K., Jonkman, F. A. M., Hekker, T. A. M., & Bos, A. (2004). Clinical research on acupuncture: Part I. What have reviews of the efficacy and safety of acupuncture told us so far? *The Journal of Alternative and Complementary Medicine, 10*, 468–480.

Bodane, C., & Brownson, K. (2002). The growing acceptance of complementary and alternative medicine. *Health Care Manager, 20*(3), 11–21.

Chen, Y. (2001). Chinese values, health and nursing. *Journal of Advanced Nursing, 36*, 270–273.

Fan, R. (2003). Modern western science as a standard for traditional Chinese medicine: A critical appraisal. *Journal of Law, Medicine, & Ethics, 31*, 213–221.

Gloth, F. M. (2001). Pain management in older adults: Prevention and treatment. *Journal of the American Geriatric Society, 49*, 188–199.

Jonas, W. B., Kaptchuk, T. J., & Linde, K. (2003). A critical overview of homeopathy. *Annals of Internal Medicine, 138*, 393–399.

Raub, J. A. (2002). Psychophysiologic effects of hatha yoga on musculoskeletal and cardiopulmonary function: A literature review. *The Journal of Alternative and Complementary Medicine, 8*, 797–812.

Steyer, T. E. (2001). Complementary and alternative medicine: A primer. *Family Practice Management, 8*(3), 37–42, 61–62.

Box 18-3 Research Highlight

Aim: This small pilot study investigated the effects of a guided imagery intervention on patients 55 years and older. All patients were men and scheduled for knee or hip replacement at a veteran's hospital.

Methods: A two-group, repeated measures experimental design was used to measure the effects of guided imagery on pain and anxiety scores, pain medication use, and lengths of stay. The control group received the usual preoperative and postoperative care, which included a tape of relaxing music. In addition to the usual preoperative and postoperative care, the intervention group received a guided imagery tape developed by Belleruth Naparstek. Data were collected using patient surveys, patient journals, chart reviews, pain VAS to measure pain, Profile of Mood States instrument to measure anxiety, and SF-12 to measure physical functioning, and a researcher developed a questionnaire to measure satisfaction with the guided imagery tapes.

Findings: The intervention group demonstrated better pain relief, decreased anxiety, and decreased length of stay. The intervention group also used less pain medication. Because of the small sample size, only descriptive statistics were used to analyze the data.

Conclusions: Although this was a small sample size, the findings did tend to support guided imagery as an effective adjunctive intervention for pain management in elderly orthopedic patients. Additional studies need to be conducted to support these findings.

Source: Antall, G. F., & Kresevic, D. (2004). The use of guided imagery to manage pain in an elderly orthopaedic population. *Orthopaedic Nursing, 23*, 335–340.

Personal Reflection

1. Think about what CAM therapies you have used personally. If you have not used any, think about one therapy you think you may want to try. Why did you use CAM, or why would you use CAM? Think about patients you have worked with who have used CAM. What was your reaction to the information? Have you changed you mind about CAM since reading the chapter? Did the patients use CAM for the same reasons you did, or thought you may?
2. Look through your local newspaper for a week. What references to CAM do you find? How many references were directed at the older adult? Were you surprised by what you found?

Critical Thinking Exercises

1. Access the National Center for Complementary and Alternative Medicine (http://nccam.nih.gov) and explore one CAM therapy listed. Discuss with a classmate the information presented. Is it readable? Could an older adult with no medical background understand the strengths and weaknesses of the therapy? Are the contraindications clear? What material would you add? What material would you subtract?
2. Interview several older adults and ask them what supplements, vitamins, or herbals they use and why. During the course of conversation, ask them if they inform their health care providers about their practices and why. Discuss your findings with a group of nursing students. As a group, identify nursing interventions appropriate for the adults interviewed.
3. In a group, review research articles exploring the efficacy of a CAM modality and research reports on clinical trials of allopathic medicines. Compare the critiques of each report.

Glossary

Ayurveda: Traditional medical system of India

Biofeedback: Use of feedback from a machine to control target functions in the body with the mind; eventually the machine feedback is eliminated

Biologically based therapy: Use of those substances found in nature for their healing properties

Chiropractic practice: Manipulation of the skeletal system by trained practitioners to put the body back in balance

Dosha: Energy in the Ayurvedic medical system

Guided imagery: Use of imagery to elicit responses in the body

Homeopathy: Medical system that follows the natural law of "like cures like"

Meditation: Conscious process to produce the relaxation response

Mind–body interventions: Use of the powers of the mind to alter physical states in the body

Naturopathic medicine: A variety of healing practices that support the body to heal itself

Pet-assisted therapy: Program in which animals are used to help patients attain, maintain, or regain physical or emotional health through visitation or formalized integration in a treatment program

Putative energy field: Vital energy that cannot be measured

Qi (Chi): Vital energy in traditional Chinese medicine

Traditional Chinese medicine (TCM): The medical system that balances the opposing forces of yin and yang

Veritable energy field: Energy that can be measured

Yang: One half of the principle of opposites that represents bright, active, upward, hot, male force in traditional Chinese medicine

Yin: One half of the principle of opposites that represents cold, dark, weak, female force in traditional Chinese medicine

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Section 11

Designer/Manager/ Coordinator of Care (Competencies 27–29)

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Chapter 19

Promoting Quality of Life

Sonya R. Hardin, PhD, RN, CCRN

LEARNING OBJECTIVES

At the end of this chapter, the reader will be able to:

1. Define quality of life for the elderly.
2. Describe a theoretical model for promoting quality of life.
3. Discuss the active aging framework proposed by the World Health Organization.
4. Identify components of each determinant of the active aging framework.
5. Utilize select strategies to promote optimal active aging.

KEY TERMS

- Active aging
- Autonomy
- Independence
- Quality of life

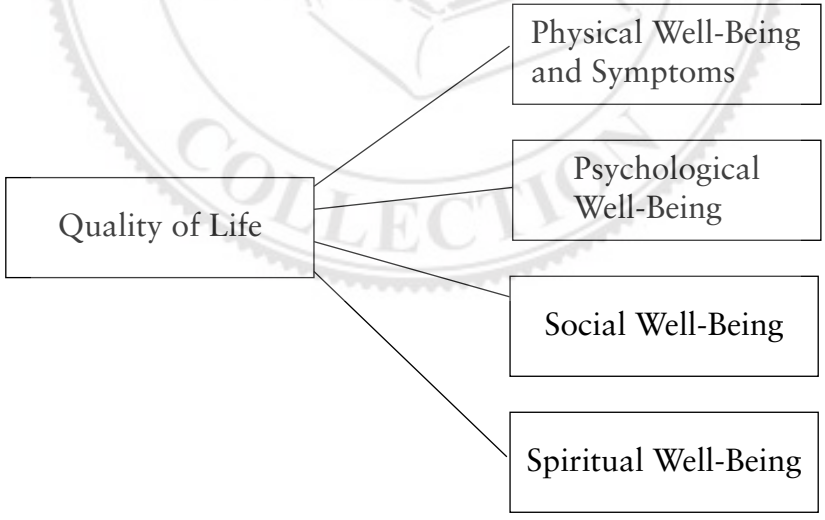
Quality of life is a concept that has many definitions; to date there is no consensus regarding the meaning of the the term. Given the concept's multidisciplinary nature, it has been defined as a degree of satisfaction or dissatisfaction with life (Abrams, 1973; Campbell, Converse, & Rogers, 1976), a person's sense of well-being (Dalkey & Rourke, 1973; Hanestad, 1990), and as dimensions such as health function, comfort, emotional response, economics, spirituality, and social support (Gough, Furnival, Schilder, & Grove, 1983; Patterson, 1975). Older people talk about quality of life in terms of family relationships, social contacts and activities, general health, and functional status (Farquhar, 1995a).

Quality of life is "an individual's perception of his or her position in life in the context of the culture and value system where they live and in relation to their goals, expectations, standards and concerns. It is a broad-ranging concept, incorporating a person's physical health, psychological state, level of independence, social relationships, personal beliefs and relationships to salient features in the environment" (WHO, 1994, p. 90). As people age, their quality of life is dependent upon their ability to maintain autonomy and independence.

Model of Quality of Life

Grant, Ferrell, Schmidt, Fonbuena, Niland, and Forman (1992) have proposed a model for understanding the components of quality of life. The Ferrell and Grant quality of life model (**Figure 19-1**) was developed using qualitative methodology. Factor analysis of patient data was

Figure 19-1 Quality of life model.



Source: Ferrans, C. E. (1996). Development of a conceptual model of quality of life. *Scholarly Inquiry for Nursing Practice: An International Journal, 10*(3), 293–304. Springer Publishing Company, Inc., New York 10012. Used by permission.

used to cluster related elements into four domains of quality of life: health and functioning, psychological/spiritual, social and economic, and family. Subsequent cross-cultural work with African Americans and Mexican Americans has provided evidence that the elements of the model appropriately reflect quality of life for these populations.

The Ferrell and Grant model identifies the four concepts of quality of life: physical well-being, psychological well-being, social well-being, and spiritual well-being. Table 19-1 displays the major concepts of this model.

Health services researchers typically identify quality of life as dimensions of health (physical and psychological) and functional status (Farquhar, 1995b). Much of the conceptual framework for measuring quality of life is derived from the World Health Organization's (WHO) definition of health. The WHO defines health as a state of complete physical, mental, and social well-being (WHO, 1958). These are all components of quality of life. So is there a distinction between health and quality of life? The WHO has integrated health and quality of life into a program called **active aging**. This program is designed to help people remain independent and active as they age. Active aging encourages older individuals to continue to work according to their capacity and to delay disabilities and chronic diseases. Active aging is being promoted by the WHO as a process of optimizing opportunities for health, participation in the community, and safe living in order to enhance quality of life as people age (WHO, 2002, p. 12). Maintaining quality of life is at the center of active aging. This chapter will look at each of the determinants described by the WHO program on active aging.

Active Aging

The term *active aging* was adopted by the WHO in the late 1990s to allow inclusion of additional factors related to healthy aging. This approach is based on the human rights of older people and the United Nations' principles of independence, participation, dignity, care, and self-fulfillment. Such an approach requires thinking to shift from "needs-based" to "rights-based" in treatment as an individual grows older. This supports an individual's right to receive interventions to enhance autonomy, independence, and activity.

An active aging approach to strategies that promote quality of life has the potential to decrease disabilities associated with chronic illness; increase elders' participation in the social, cultural, economic, and political aspects of society; and lower the cost of medical treatment. These interventions recognize the need to encourage individuals to plan and prepare for older

Table 19-1 PHYSICAL, PSYCHOLOGICAL, SOCIAL, AND SPIRITUAL WELL-BEING

Physical Well-Being	Psychological Well-Being	Social Well-Being	Spiritual Well-Being
Functional ability, strength/fatigue, sleep/rest, nausea, appetite, constipation	Anxiety, depression, enjoyment/leisure, pain distress, happiness, fear, cognition/attention	Caregiver burden, roles and relationships, affection/sexual function, appearance	Suffering, meaning of pain, religiosity, transcendence

age and to choose healthy lifestyles. Active aging can enhance and ensure one's quality of life in later years.

The World Health Organization has identified determinants of health that affect aging and the quality of life of individuals, communities, and nations. Healthy aging is influenced by gender and culture in addition to the following determinants: behavioral, social and physical environments; personal, economic, and social service systems. Behavioral determinants include physical activity, nutrition, smoking, alcohol, and medication adherence. Determinants related to personal characteristics include genetics and psychological factors. Physical environment determinants include neighborhoods and safe housing. Social support, education and literacy, violence, and abuse make up the social environment determinants. Economic determinants include income and social protection. Determinants related to social services include health promotion and disease prevention.

Box 19-1 Research Highlight

Aim: The aim of this study was to describe the correlates of quality of life in home-dwelling and institutionalized elderly.

Methods: One hundred and fifty-two elderly residents of long-term care homes and 160 community-dwelling elderly participated in the study. Assessment included demographic and social variables, health status, nutritional state, and physical and cognitive function. Physical activity was assessed by two questionnaires: the Seven Day Recall PA Questionnaire and the Stanford Usual Activity Questionnaire. Quality of life was assessed with the Euroqol 5D questionnaire.

Findings: Depression was the most powerful predictor of quality of life in both community-dwelling and institutionalized elderly. Complaints associated with the musculoskeletal system in community-dwelling elders and manifestations of atherosclerosis and cardiovascular disease in institutionalized elders were the most important concomitant diseases. Regular participation in physical activity, preventing obesity, and maintaining adequate levels of physical and cognitive function contributed more to overall quality of life in community dwellers than in older and frailer institutionalized elderly adults.

Conclusions: The relative contribution of functional and medical comorbidities, as well as health-promoting behaviors, to quality of life may be different in community-dwelling versus institutionalized elders. Physical and cognitive function deficits, overweight/obesity, and lack of regular activity are among the primary predictors of decreased quality of life in home-dwelling elders. In institutionalized elders, the role of concomitant diseases is the dominant factor in quality of life.

Source: Borowiak, E., & Kostka, T. (2004). Predictors of quality of life in older people living at home and in institutions. *Aging Clinical and Experimental Research, 16*(3) 212–220.

Gender and culture influence all the determinants of healthy aging. In many countries females have a lower social status and less access to food, education, and health care; however, males are more likely to engage in behaviors such as smoking, alcohol, drug consumption, and strenuous labor. Values and traditions determine how a society views aging. Some societies view aging as a natural period of decline without expectations of a high quality of life, and thus are less likely to provide prevention, early detection, and tailored interventions for the elderly when symptoms are attributed to the aging process. Aging is viewed as a life process, one in which ultimate deterioration is expected and should be accepted. Health-seeking behaviors also are influenced by culture and values. Enhancing individual quality of life must respect diverse ethnicities while educating to overcome folk medicine beliefs or prejudice against formal biomedicine.

Behavioral Determinants

Behavioral determinants refer to behaviors that promote healthy lifestyles. Healthy behaviors are just as important to older persons as to the young. Aging should not deter an individual from improving quality of life through engaging in physical activity, healthy eating, social support, and medication compliance as well as avoiding tobacco and limiting alcohol intake.

Physical Activity

The literature is clear that physical activity, even if initiated in later years, contributes to high physical and cognitive functioning, overall health, and engagement with life (Aranceta, Perez-Rodrigo, Gondra, & Orduna, 2001; Fillit et al., 2002; Houde & Melillo, 2002; Mattson, Chan, & Duan, 2002; Oguma, Sesso, Paffenbarger, & Lee, 2002). Specifically, physical activity contributes to muscle strength, flexibility, balance, cardiovascular health, and positive mood, and improves cognition. It has also been found to prevent falls and improve brain function, even after brain injury (Aranceta et al.; Houde & Melillo; Mattson et al.). Physical activity as well as resistance exercise training have been found to promote muscle functioning in elders by strengthening muscles, improving flexibility and strength, and preventing muscle loss (Schulte & Yarasheski, 2001; Thompson, 2002). Participation in moderate-intensity physical activity is associated with longevity and well-being (Aranceta et al.; Mattson et al.; Oguma et al.). Seniors who engage in an active lifestyle improve their physical well-being and social activities (Aranceta et al.). Conversely, physical inactivity is associated with muscle atrophy, reduced endurance and muscle strength, increased falls, and increased mortality (Oguma et al.; Thompson). Physical inactivity leads to a decline in physical function and recreational and social opportunities. Dependence on others for assistance with activities of daily living is a critical outcome resulting from decreased activity, and predicts loss of independence and nursing home admission (Oguma et al., 2002; Schulte & Yarasheski; Thompson; Wilkins, 2001). Physical activity is essential for optimal physical, cognitive, and emotional functioning. Therefore, physical activity may be the primary factor for promoting optimal aging.

Benefits of Exercise. The potential for regular exercise to offset the deleterious effects of aging is well established. In fact, the pronounced health benefits attributed to regular exercise, including improvements in resting blood pressure, cholesterol profile, osteoarthritis, osteoporosis, diabetes mellitus, and cognitive functioning, can be achieved even in those individuals who start physical conditioning

programs later in life. Yet, despite these impressive data, approximately 70% of elderly Americans are physically inactive (King, 2001). A hypokinetic state not only negatively affects the health status of the elderly, but also significantly influences health care costs as more Americans are attaining octogenarian status. Health care workers should actively encourage elderly individuals to maintain or start an exercise program. Such recommendations may help to decrease comorbid conditions associated with the aging process, increase functional independence, and attenuate skyrocketing health care costs associated with treating the growing elderly population (Dejong & Franklin, 2004).

Many studies have examined the benefits of exercise in frail elders living in skilled nursing facilities, where the effect of group-centered interventions is easy to assess (Fisher, Pendergast, & Calkins, 1991; McMurdo & Rennie, 1993; Sauvage et al., 1992; Schnelle, MacRae, Ouslander, Simmons, & Nitta, 1995). These institutionalized populations, who often have varying degrees of cognitive impairment, can be challenging, both when trying to establish motivation for exercise and when creating opportunities for group reinforcement and participation. Study variables on which exercise interventions have had an impact include those directly related to the exercise itself—changes in mobility or strength. More indirect but perhaps more functionally relevant benefits also accrue from exercise, such as improved sleep, improved mood, and overall well-being of the participants (King, Rejeski, & Buchner, 1998). Older adults may be easily discouraged by a belief that for exercise to be beneficial, one must walk very fast, lift weights at a gym, or exercise every day. Many exercise programs for the elderly that have extended independence and improved activities of daily living include very simple regimens such as lifting cans of vegetables of varying weights, doing leg lifts from a sitting position, or walking lengths of the hall a few times in one's home a couple of times a day. One should set very low goals to guarantee success. Diaries have been shown to be effective in increasing activity. Any movement is better than none, so every little activity should be encouraged (van der Bij, Laurant, & Wensing, 2002).

Physical activity interventions are not always effective because older adults often do not comply with planned exercise for the long term. For older adults, interventions should be tailored to individuals' preferences and should be directed toward home-based intervention. Intense long-term strategies and behavioral strategies will promote adherence (van der Bij et al., 2002).

Individuals living at home must be coached about completing a safety check to ensure a safe pathway through their home. Establishing hand rails along a hall can ensure safety for those individuals with health concerns such as dizziness or for whom conditions may force them to stay inside. Others may benefit from watching and moving with a televised program; for example, a colleague reported that after working with African Americans in a housing development, by having them play Motown records and dance around for 20 minutes a day, they were later able to increase their ability to walk around the building. Health care providers may do well to use neutral words such as *movement* or *activity* rather than *exercise*, which raises self-expectations to an extreme for some.

One major intervention study conducted in a supervised group setting used daytime arm and leg exercises as a means to improve the sleep of nursing home residents. The investigators found that participants' quality and quantity of sleep

improved by about 40% during subsequent nighttime observations (Alessi, Yoon, Schnelle, Al-Samarrai, & Cruise, 1993). Another institutionally based study examined the effect of weight-training on strength and stair climbing in a selected group of very old (mean age 87 years) nursing home residents (Fiatarone et al., 1994). Participants assigned to the intervention group receiving a socialization intervention had enhanced overall mobility compared with the control group. This study provides the best evidence that exercise can produce short-term, highly relevant improvements for even the oldest frail elders. In another group of nursing home patients for whom stair climbing was considered well beyond their functional capacity, a structured strength-training program using resistance exercise of upper extremities dramatically improved spontaneous activity (Evans, 1999).

Interventions to promote physical activity in older adults can be organized by level of impact using individual and interpersonal approaches through environmental- and societal-level interventions (King, 1991). Interventions that facilitate physical activity among the elderly include goal setting, self-monitoring, feedback, support, stimulus control, and relapse-prevention training (Young & King, 1995). Using both positive self-talk and goal setting produces greater physical activity adherence (Atkins, Kaplan, Timms, Reinsh, & Lofback, 1984). Also useful is telephone supervision and home-based physical activity programs (King, Haskell, Taylor, Kraemer, & DeBunk, 1991).

Nutrition

The literature provides evidence that proper nutrition is a powerful, modifiable lifestyle factor that may delay or prevent chronic diseases in later life and, more importantly, will potentially lead to additional years of health, productivity, and high functioning. For those who are inactive, good nutrition enhances skin integrity and prevents skin breakdown (Shikany & White, 2000). However, older adults may be at risk for inadequate nutrition because of physiological changes related to organ function declines, which can affect digestion, metabolism, and absorption of nutrients (Lueckenotte, 2000). Additionally, older adults' nutritional intake may be compromised because of the development of poor eating habits related to chewing or swallowing difficulties as well as diminished interest in food resulting from sensory loss (e.g., taste and smell) (Swartzberg, Margen, and Editors 2001). Physically active seniors' diets are relatively higher in dairy products and fruits than are the diets of sedentary older adults (Aranceta et al., 2001). Proper nutrition, with an emphasis on consuming fruits and vegetables, has long-term health benefits and contributes to physical, cognitive, and overall well-being (Lange-Collette, 2002; Pullen & Walker, 2002). However the costs associated with healthier foods on a limited budget are an issue for many elderly.

Evidence suggests that adequate nutrition has great benefits; however, researchers have noted that many older adults are deficient in particular vitamins and minerals, including vitamins B_6, B_{12}, D, K, and folic acid, and the antioxidant vitamins A, C, E, and beta carotene, as well as the minerals selenium, calcium, and iron, which are essential for overall health (Fillit et al., 2002). Cognitive function can be impacted by nutrition; specifically, malnutrition can cause long-term cognitive impairment (Fillit et al.). Research findings also indicate that elders with various vitamin deficiencies, especially

of B_{12}, may be at risk for cognitive disorders (including dementia) that were previously considered to be due to normal cognitive aging; other nutrients, such as antioxidants and vitamin C, may be protective against cognitive decline (Fillit et al.; Mattson et al., 2002).

Other dietary factors associated with health in advancing age, particularly for women, may be the consumption of significantly lower percentages of calories from fat and a higher percentage of calories from complex carbohydrates (Klein et al., 2004). In relation to dietary fats, future health in both men and women was predicted by higher baseline high-density lipoprotein cholesterol levels, as well as lower low-density lipoprotein cholesterol levels for women. Eating a healthy diet has been found to assist with weight reduction and decrease serum cholesterol and has been associated with decreasing incidence of coronary artery disease (CAD), diabetes, colon cancer, and osteoporosis, although these require early dietary intervention (Lange-Collette, 2002).

Additional findings suggest that optimal calcium intake is critically related to reducing the risk of bone loss and osteoporosis and decreasing the incidence of fractures in both men and women (Shikany & White, 2002). A diet with high soy protein combined with regular weight-bearing physical activity may protect against osteoporosis (Lange-Collette, 2002). Osteoporosis can prevent optimal physical activity and, in turn, participation in social and community recreational activities, thus denying the benefits of such participation. Dietary intake is often associated with income and living arrangements. It is clear that health care providers must be sensitive to individuals' income levels and ability to apply for public assistance as well as cultural constraints on food selections. Some individuals may benefit from having a high-potency vitamin prescribed so that their insurance or pharmacy plan may cover the costs. Others may be unaware of simple requirements such as the amount of protein recommended on a daily basis. Health care providers should consider the individual's budget and realize that fresh vegetables and fruit may be cost prohibitive. Always ask the person to make out a grocery list or save store receipts so that the health care provider can help the individual review his or her choices.

Smoking

In countries that report deaths that are attributable to smoking, cigarettes were responsible for an estimated 21 million deaths from 1990 to 1999, with more than half of those deaths occurring in people 35 to 69 years of age (Joint Committee on Smoking and Health, 1995). The 1990 report of the Surgeon General differentiates smoking-related deaths in the United States by disease category. Cigarette smoking accounts annually for an estimated 115,000 deaths from heart disease, 106,000 deaths from lung cancer, 32,000 deaths from other cancers, 57,000 deaths from chronic obstructive pulmonary disease (COPD), and 27,500 deaths from strokes (U.S. Department of Health and Human Services, 1990). In addition to these extraordinary mortality rates, the annual direct financial burden of smoking is estimated to exceed $50 billion, which is about one tenth of all health care costs in the United States each year (Herdman, Hewitt, & Laschober, 1993). Currently, 26.4% of adult men and 22.0% of adult women in the United States smoke, representing 47.2 million lives (Centers for Disease Control and Prevention [CDC], 2004).

Smoking is the single most important preventable risk factor to human health in developed

countries and an important cause of premature death worldwide (Joint Committee on Smoking and Health, 1995). Each year, more than 70% of all smokers have at least one visit to a physician for a respiratory problem (CDC, 2004). Approximately 35% of smokers report having made a serious attempt to quit smoking over the last year (Hatziandreu et al., 1990) and 80% report an attempt to quit sometime in their past (U.S. Department of Health and Human Services, 1989). A population-based survey (Goldstein et al., 1997) found that less than 15% of smokers who saw a physician in the past year were offered assistance in quitting smoking and only 3% had a follow-up appointment to address tobacco use.

The first step in treating tobacco use and dependence is to identify tobacco users. The effective identification of tobacco use status not only opens the doors for successful interventions, but also guides clinicians to identify appropriate interventions based on a patient's willingness to quit. A guideline that was developed by a private-sector panel of experts convened by a consortium of federal and non-federal partners recommended the implementation of an office-wide protocol that systematically solicits and documents the tobacco-use status of each patient at every visit. Such a practice can be done effectively by expanding the number of vital signs to include smoking status or by placing an appropriate tobacco-use sticker on all patient charts. In clinical settings where tobacco use has been universally documented, the rate at which physicians then asked their patients about smoking and provided specific advice on quitting approximately doubled (Fiore et al., 1995).

The 2000 guideline documents that clinical interventions as brief as 3 minutes can substantially increase cessation success. This finding supports the idea that a personalized clinician message meaningfully enhances the likelihood that a smoker will make a successful attempt to quit smoking. Therefore, it is essential to provide at least a brief intervention for all tobacco users at each clinic visit.

Because effective tobacco dependence treatments are available, every patient who uses tobacco should be offered at least one of the following treatments:

1. Patients willing to try to quit using tobacco should be provided with treatments that are identified as effective in the guideline.
2. Patients unwilling to try to quit using tobacco should be provided with a brief intervention that is designed to increase their motivation to quit.

For Patients Willing to Quit: The 5 As. The "5As" were designed as a brief and effective intervention for tobacco users willing to make an attempt to quit smoking (**Table 19-2**). It is important for the clinician to ask patients whether they use tobacco; to advise them to quit in a clear, strong, and personalized manner; and to assess their willingness to make an attempt to quit at that time. If the patient agrees to attempt cessation, the clinician should then assist in making a quit attempt and should arrange for follow-up contacts to prevent a relapse (**Box 19-2**).

For Patients Not Ready to Quit: The 5Rs. For patients not willing to make an attempt to quit at the time of an assessment or hospital admission, health professionals should provide a brief intervention that is designed to promote the motivation to quit (the "5 Rs"; **Table 19-3**). Patients may be unwilling to make an attempt to quit for a variety of reasons. Many older indi-

Table 19-2 Brief Strategies: Helping the Patient Willing to Quit

Action	Strategies for Implementation
Ask—Systematically identify all tobacco users at every visit.	
Query patient at every office visit.	Expand the vital signs to include tobacco use or use an alternative universal identification system.
Advise—Strongly urge all tobacco users to quit.	
Urge every tobacco user to quit.	Advice should be: **Clear**—"I think it is important for you to quit smoking now and I can help you. Cutting down while you are ill is not enough." **Strong**—"As your clinician, I need you to know that quitting smoking is the most important thing you can do to protect your health now and in the future. The clinic staff and I will help you." **Personalized**—Tie tobacco use to current health/illness, and/or its social and economic costs, motivation level/readiness to quit, and/or the impact of tobacco use on children and others in the household.
Assess—Determine willingness to make a quit attempt.	
Ask if he or she is willing to make an attempt at this time (e.g., within the next 30 days).	Assess patient's willingness to quit: If the patient is willing to make an attempt to quit at this time, provide assistance. If the patient will participate in an intensive treatment, deliver such a treatment or refer him or her to an intensive intervention. If the patient clearly states he or she is unwilling to make an attempt to quit at this time, provide a motivational intervention. If the patient is a member of a special population (e.g., adolescent, pregnant, racial/ethnic minority) consider providing additional information.
Assist—Aid the patient in quitting.	
Help the patient with a plan to quit.	A patient's preparations for quitting (STAR): **S**et a quit date; ideally, the quit date should be within 2 weeks. **T**ell family, friends, and coworkers about quitting, and request understanding and support. **A**nticipate challenges to the planned quit attempt, particularly during the critical first few weeks; these include nicotine withdrawal symptoms. **R**emove tobacco products from your environment; prior to quitting, avoid smoking in places where you spend a lot of time (e.g., work, home, car).

Table 19-2 Brief Strategies: Helping the Patient Willing to Quit (continued)

Action	Strategies for Implementation
Provide practical counseling (problem solving/skills training).	**Abstinence**—Total abstinence is essential; "not even a single puff after the quit date." **Past quitting experience**—Review past quit attempts, including identification of what helped during the quit attempt and what factors contributed to relapse. **Anticipate triggers or challenges in the upcoming attempt**—Discuss challenges/triggers and how the patient will successfully overcome them. **Alcohol**—Drinking alcohol is highly associated with relapse; the patient should consider limiting/abstaining from alcohol during the quit process. **Other smokers in the household**—The presence of other smokers in the household, particularly a spouse or partner, is associated with lower abstinence rates. Patients should encourage significant others to quit with them. If others continue to smoke they should be asked to smoke outdoors and not in the quitter's presence.
Provide intratreatment social support.	Provide a supportive clinical environment while encouraging the patient in his or her quit attempt: "My office staff and I are available to assist you."
Help patient obtain extratreatment social support.	Help the patient develop social support for his or her attempt to quit in his or her environments outside of treatment: "Ask your spouse/partner, friends, and coworkers to support you in your quit attempt."
Recommend pharmacotherapy.	Recommend the use of pharmacotherapies; explain how these medications increase smoking cessation success and reduce withdrawal symptoms. The first-line pharmacotherapy medications include the following: bupropion SR, nicotine gum, nicotine inhaler, nicotine nasal spray, and nicotine patch.
Provide supplementary materials.	**Sources**—Federal agencies, nonprofit agencies, or local/state health departments **Type**—Culturally/racially/educationally/age appropriate for the patient **Location**—Readily available at every clinician's workstation

(continues)

Table 19-2 BRIEF STRATEGIES: HELPING THE PATIENT WILLING TO QUIT (CONTINUED)

Action	Strategies for Implementation
Arrange—Schedule follow-up contact.	
Schedule follow-up contact, either in person or via telephone.	**Timing**—Follow-up contact should occur soon after the quit date, preferably during the first week. A second follow-up contact is recommended within the first month; schedule further follow-up contacts as indicated. **Actions during follow-up contact**—Congratulate success; if tobacco use has occurred, review circumstances and elicit recommitment to total abstinence. Remind the patient that a lapse can be used as a learning experience. Identify problems already encountered and anticipate challenges in the immediate future. Assess pharmacotherapy use and problems. Consider use or referral to more intensive treatment.

Source: Fiore, M. C., et al. (2000). *Treating tobacco use and dependence: Clinical practice guideline.* Rockville, MD: U.S. Department of Health and Human Services, Public Health Service.

viduals may view an attempt to quit as too late in their stage of life. They may not realize how side effects of smoking are relevant to their personal health history. These patients may, however, respond to a motivational intervention that provides the health care provider an opportunity to educate and reassure the patient by means of the following 5 Rs: relevance, risks, rewards, roadblocks, and repetition (Colby et al., 1998; Prochaska & Goldstein, 1991).

Pharmacotherapies for Smoking Cessation. Numerous effective pharmacotherapies for smoking cessation now exist. Except in the presence of contraindication(s), these should be used with all patients who are attempting to quit smoking. The treatment of tobacco dependence, like the treatment of other chronic diseases, requires the use of multiple modalities. Pharmacotherapy is an essential element of a multicomponent approach.

The five first-line medications with an established empirical record of efficacy in smoking cessation are bupropion SR (Zyban), the nicotine patch, nicotine gum, nicotine inhaler (Nicotrol Inhaler), and nicotine nasal spray (Nicotrol NS). These medications are summarized in Table 19-4. Combining the nicotine patch with a self-administered form of nicotine replacement therapy (NRT), such as the gum, the inhaler, or the nasal spray, is more efficacious than a single form of nicotine replacement. Patients should be encouraged to use combined treatments if they are unable to quit using a single method.

ALCOHOL

Alcohol abuse and alcoholism are underrecognized problems in the elderly population. One third of older alcoholic persons have developed alcoholism in later life; the other two thirds of the population will grow older with the medical and psychosocial sequelae of early-onset alcoholism. Sixty-two percent of community-dwelling adults ages 60 to 94 were found to drink alcohol (Mirand & Welte, 1996). In the

Box 19-2 Resource List

Smoking cessation resources for health care professionals available on the Internet include the following:

- www.smokefree.gov, sponsored by the National Cancer Institute, provides smoking-related resources for health professionals; includes Web sites and government reports.
- www.treatobacco.net, sponsored by the Society for Research on Nicotine and Tobacco and the World Health Organization Europe, provides evidence-based information on treating tobacco dependence.
- www.cdc.gov/tobacco, sponsored by the Centers for Disease Control, provides a wealth of information regarding smoking, including reports, statistics, resources, and past Surgeon General reports.
- www.surgeongeneral.gov/tobacco provides smoking cessation materials for both clinicians and consumers.

Exercise resources available on the Internet for health care professionals include the following:

- *Physical Activity and Health: A Report of the Surgeon General* (1996): http://profiles.nlm.nih.gov/NN/B/B/H/B/
- Physical activity and older Americans: Benefits and strategies: http://www.ahrq.gov/ppip/activity.htm
- Strength training for older adults: http://www.cdc.gov/nccdphp/dnpa/physical/growing_stronger/

Nutrition resources available on the Internet for health care professionals include the following:

- The Center for Nutrition Policy and Promotion, an organization of the U.S. Department of Agriculture: http://www.mypyramid.gov
- This Web site links you to healthy eating sites: http://www.healthyeating.net/he_1.htm
- Elderly Nutrition: http://www.nal.usda.gov/foodstamp/Topics/elderly_nutrition. html
- Food Guide Pyramid: http://www.nal.usda.gov/fnic/etext/000023.html

Alcohol resources available on the Internet for health care professionals include the following:

- Worldwide recommendations for alcohol consumption: http://www.drinkingandyou.com/site/uk/biggy.htm
- The Physicians' Guide to Helping Patients with Alcohol Problems: http://www.niaaa.nih.gov/publications/physician.htm

elderly, the effects of alcohol may be increased because of pharmacologic changes associated with aging. Interactions between alcohol and drugs, prescription and over-the-counter, may also be more serious in elderly persons. Physiologic changes related to aging can alter the presentation of medical complications of alcoholism (Rigler, 2000, p. 171). The National Institute on Alcohol Abuse considers one drink per day to be the maximum amount for

Table 19-3 Enhancing Motivation to Quit Tobacco: The 5 Rs

Motivation	Description
Relevance	Encourage the patient to indicate why quitting is personally relevant, being as specific as possible. Motivational information has the greatest impact if it is relevant to a patient's disease status or risk, family or social situation (e.g., having children in the home), health concerns, age, gender, and other important patient characteristics (e.g., prior quitting experience, personal barriers to cessation).
Risks	The clinician should ask the patient to identify potential negative consequences of tobacco use; the clinician may suggest and highlight those that seem to be the most relevant to the patient. The clinician should emphasize that smoking low-tar/low-nicotine cigarettes or use of other forms of tobacco (e.g., smokeless tobacco, cigars, and pipes) will not eliminate these risks. Examples of risks are: **Acute risks**—Shortness of breath, exacerbation of asthma, harm to pregnancy, impotence, infertility, increased serum carbon monoxide **Long-term risks**—Heart attacks and strokes, lung and other cancers (larynx, oral cavity, pharynx, esophagus, pancreas, bladder, cervix), chronic obstructive pulmonary diseases (chronic bronchitis and emphysema), long-term disability and need for extended care **Environmental risks**—Increased risk of lung cancer and heart disease in spouses; higher rates of smoking by children of tobacco users; increased risk for low birth weight, SIDS, asthma, middle ear disease, and respiratory infections in children of smokers
Rewards	The clinician should ask the patient to identify potential benefits of stopping tobacco use. The clinician may suggest and highlight those that seem to be the most relevant to the patient. Examples of rewards include the following: Improved health Food will taste better Improved sense of smell Save money Feel better about yourself Home, car, clothing, breath will smell better Can stop worrying about quitting Set a good example for kids Have healthier babies and children Not worry about exposing others to smoke Feel better physically Perform better in physical activities Reduced wrinkling/aging of skin
Roadblocks	The clinician should ask the patient to identify barriers or impediments to quitting and note elements of treatment (i.e., problem solving, pharmacotherapy) that could address barriers. Typical barriers might include:

Table 19-3 Enhancing Motivation to Quit Tobacco: The 5 Rs (continued)

Motivation	Description
	Withdrawal symptoms Fear of failure Weight gain Lack of support Depression Enjoyment of tobacco
Repetition	The motivational intervention should be repeated every time an unmotivated patient visits the clinic setting; tobacco users who have failed in previous quit attempts should be told that most people make repeated quit attempts before they are successful.

Source: Fiore, M. C., et al. (2000). *Treating tobacco use and dependence: Clinical practice guideline.* Rockville, MD: U.S. Department of Health and Human Services, Public Health Service.

"moderate" alcohol use in individuals over the age of 65 (O'Connor & Schottenfeld, 1998).

Published health benefits of regular light-to-moderate alcohol consumption include lower myocardial infarction rates, reduced heart failure rates, reduced risk of ischemic stroke, lower risk for dementia, decreased risk of diabetes, and reduced risk of osteoporosis. Numerous complementary biochemical changes have been identified that explain the beneficial effects of moderate alcohol consumption. Heavy alcohol consumption, however, can negatively affect neurologic, cardiac, gastrointestinal, hematologic, immune, psychiatric, and musculoskeletal organ systems (Rigler, 2000).

Binge drinking is a significant problem even among moderate drinkers and is associated with particularly high social and economic costs. The elderly are also commonly prescribed an average of 7–8 medications, many of which are negatively affected by alcohol. A cautious approach should be emphasized for those individuals who drink even small amounts of alcohol. Many elderly are taking antianxiety drugs such as Valium and Xanax that can be potentiated by the use of alcohol. Also, the regular use of alcohol should be discouraged in those individuals with depressive illnesses where alcohol taken in combination with other drugs as common as Tylenol may contribute to a suicide attempt.

An American Heart Association (AHA) position statement cautions that if you drink alcohol, do so in moderation. Moderation is considered an average of one to two drinks per day for men and one drink per day for women. They further caution people *not* to start drinking, and to consult their doctor on the benefits and risks of consuming alcohol in moderation (AHA, 2002).

The popularity of the topic of the health benefits of moderate alcohol intake in both medical journals and the lay press gives rise to increased discussion of the subject. A recent column by a popular wine journalist reported on medical studies that moderate drinking can help prevent strokes, amputated limbs, and dementia. The cardiac benefits of low-dose alcohol are evident

Table 19-4 PHARMACOTHERAPY FOR SMOKING CESSATION

Factor	Bupropion SR	Patch	Gum	Inhaler	Nasal Spray
Treatment period	7–12 wk. Take for 1–2 wk before quitting smoking. May use for maintenance for up to 6 mo.	6–8 wk.	Up to 12 wk. May use for longer time as needed.	3–6 mo. Taper use over last few weeks.	3–6 mo. Taper use over last few weeks.
Dosage	Days 1–3: 150-mg tablet each morning. Days 4–end: 150-mg tablet in morning and evening.	One patch each day. Taper dose if using: 21 mg for 4 wk, 14 mg for 2 wk, 7 mg for 2 wk. No taper if using 15 mg for 8 wk. Light smokers (10 cigarettes/d), can start with lower dose.	2 mg. 4 mg (heavy smokers). Chew one piece every 1–2 h (10–15 pieces/d). Many people do not use enough gum—chew gum whenever you need it!	6–16 cartridges/d. Need to inhale about 80 times to use up cartridge. Can use part of cartridge and save the rest for later that day.	One dose equals one squirt to each nostril. Dose 1–2 times/h as needed: minimum = 8 doses/d; maximum = 40 doses/d.
Pros	Easy to use. Reduces urges to smoke.	Easy to use. Steady dose of nicotine.	Can control your own dose. Helps with predictable urges (e.g., after meals). Keeps mouth busy.	Can control your own dose. Helps with predictable urges. Keeps hands and mouth busy.	Can control your own dose. Fastest acting for relief of urges.
Cons	May disturb sleep. May cause dry mouth.	May irritate skin. May disturb sleep. Cannot adjust amount of nicotine in response to urges.	Need to chew correctly—"chew and park." May stick to dentures. Should not drink acidic	May irritate mouth and throat (improves with use). Does not work well < 40°.	Need to use correctly (do not inhale it). May irritate nose (improves with use). May cause dependence.

(continues)

Table 19-4 PHARMACOTHERAPY FOR SMOKING CESSATION (CONTINUED)

Factor	Bupropion SR	Patch	Gum	Inhaler	Nasal Spray
			beverages while chewing gum.	Should not drink acidic beverages while using inhaler.	
Caution	Do not use if you have a seizure disorder, an eating disorder, or are already taking a monoamine oxidase inhibitor.	Do not use if you have severe uncontrolled eczema or psoriasis.	Caution with dentures.		Do not use if you have severe reactive airway disease (asthma).
Availability	Prescription only.	Over the counter (regular/mint/orange flavors).	Over the counter.	Prescription only.	Prescription only.

Source: Fiore, M. C., et al. (2000). *Treating tobacco use and dependence: Clinical practice guideline.* Rockville, MD: U.S. Department of Health and Human Services, Public Health Service.

in study after study. He quoted Abigail Zuger's *New York Times* article titled, "The Case for Drinking," which describes the growing body of evidence that people who consume wine in moderation tend to be healthier and live longer (Zuger, 2002). He further decried the political correctness of institutions and authorities that at worst cover up the results of the Framingham study and at best are too timid to go so far as to recommend wine in moderation. He concludes by advising his readers to discuss the topic with their family physicians (Garr, 2003).

Individuals who are currently abstinent and comfortable with that lifestyle should not be encouraged to start drinking solely for the potential health benefits. Although convincing data do not currently exist, the risks of developing abusive drinking patterns and the associated detrimental health effects potentially outweigh the advantage of light to moderate drinking (Cherpitel et al., 1995; Dawson, 2001). Exceptions to this conservative stance may be considered for the patient who is 1) well known to the physician, 2) has no apparent abuse liability, and 3) has cardiovascular risks that demand aggressive intervention and is on no medications that prohibit alcohol use. For those choosing to initiate alcohol consumption, a conservative prescription-like recommendation of a precise amount at a given time (e.g., one glass of red wine with the evening meal) would seem indicated. Careful monitoring for

escalating usage and/or adverse health consequences is appropriate.

For individuals who have established an adaptive and enjoyable pattern of appropriate alcohol use, and have no identified health problems that could be adversely affected by alcohol use, there appears to be no compelling reason to encourage them to abstain (Rehm, Greenfield, & Rogers, 2001), although continued monitoring is indicated. After assessing for contraindications, individuals who do not have a history of alcohol abuse can be counseled regarding the health benefits of light to moderate consumption (Ellison, 2002). Although some studies show no difference in the beneficial effects of different forms of alcohol (Gaziano et al., 1999), others have found red wine to be most beneficial (Grønbæk et al., 2000).

Recommendations regarding alcohol intake should be individualized based on age and gender as well as physical and mental health status (Drory, 2001). Individuals with medical, psychiatric, or pharmacologic contraindications, and those with personal and/or family histories of substance abuse should be encouraged not to drink at all; however, lower limits may be appropriate for those with hypertension or diabetes (Meister, Whelan, & Kava, 2000). Everyone should be cautioned regarding the effect of even moderate drinking on motor skill activities such as driving (Drory).

The following are four steps for treating alcoholism in the elderly:

1. Identify individuals requiring treatment.
2. Determine individuals' readiness to discuss treatment.
3. Assess individuals requiring detoxification.
4. Plan for postdetoxification treatment in coordination with other professionals.

When assessing the elderly for alcohol use, health care providers should assess for cognitive decline, nonadherence with appointments, psychiatric history, insomnia, poorly controlled hypertension, frequent falls, gastrointestinal problems, nutritional deficiencies, delirium during hospitalization, elevated corpuscular volume on CBC, and family problems. Cancers of the head, neck, and esophagus are associated with chronic alcohol abuse. Also, liver cancer is associated with cirrhosis as a side effect of chronic alcohol abuse.

Hospitalization is recommended for detoxification of those elderly who are dependent on alcohol. Older individuals with multiple medical conditions have a decreased reserve and are at risk for delirium and seizure during withdrawal. Treatment typically consists of benzodiazepines, specifically shorter-acting benzodiazepines, as well as thiamine and other vitamin supplements. Following detoxification, older patients should be directed into elder-specific outpatient therapy for long-term adherence (Rigler, 2000).

Medication Adherence

In the past few decades, hundreds of research articles have been published on nonadherence. Dozens of devices and programs have been developed to assess and resolve adherence-related problems. Yet, despite the tremendous efforts of pharmacists and other health care providers, medication nonadherence remains a major public health problem, particularly for aging persons. Indeed, the National Council on Patient Information and Education (NCPIE) has aptly termed nonadherence "America's other drug problem" (NCPIE, 1997). NCPIE has noted that nonadherence can take a variety of forms, including not having a prescription filled; taking an incorrect dose; taking a med-

ication at the wrong time; forgetting to take doses; or stopping therapy too soon due to the costs, a logical decision, or side effects unknown to the physician. Medication adherence can be influenced by herb use and over-the-counter medications as first choices prior to utilizing prescription drugs.

Medication nonadherence is a major public health problem that has been called an "invisible epidemic" (Fincham & Wertheimer, 1985; Smith, 1996). Nonadherence to pharmacotherapy has been reported to range from 13% to 93%, with an average rate of 40% (Bond & Hussar, 1991). The problem encompasses all ages and ethnic groups, but is even more prevalent in the elderly; it has been estimated that 55% of the elderly are nonadherent (Bruce et al., 2004). A host of individual characteristics may also influence adherence, such as the patient's religion, health beliefs, social support system, and ethnicity. Although a plethora of attributes and variables have been evaluated as predictors of adherence, the frequency of dose has been identified by multiple studies as contributing to nonadherence.

Rates of nonadherence vary with different disease states. For example, the nonadherence rate for hypertension is reported to be 40%, whereas that for arthritis has been found to range between 55% and 70% (Task Force for Compliance, 1994). Nonadherence rates are especially high among patients with chronic diseases (Blandford et al., 1999). These patients, who typically require long-term, if not lifelong, medications to control symptoms and prevent complications, often must make significant behavioral changes to adhere with pharmacotherapy. Such changes can be difficult to integrate into everyday life.

Direct and indirect methods of assessing medication adherence can be utilized to identify elderly people having difficulty in adhering to prescribed regimens. Health care professionals can monitor blood levels and/or urine assays for drug metabolites or marker compounds. Indirect methods of assessing adherence include patient interviews, pill counts, refill records, medication organizers, and measurement of health outcomes. The interview method is inexpensive and allows the health care professional to show concern for the patient and provide immediate feedback. A drawback of this method is that it can overestimate adherence, and its accuracy depends on the patient's cognitive abilities and the honesty of his or her replies, as well as the interviewer's correct interpretation of responses. Pill counts provide an objective measure of the quantity of drug taken over a given time period; however, this method is time-consuming and assumes that medication not in the container was consumed. The refill record provides an objective measure of quantities obtained at given intervals, but assumes that the patient obtained the medication only from the recorded source and assumes the individual actually takes the pills.

Strategies to improve adherence should target the specific risk factors and causes identified during the patient assessment (**Case Study 19-1**). Adherence aids, such as medication organizers, may be used alone or in combination, but should be tailored to the individual patient. For example, a forgetful patient may benefit from a special package or container that provides a visual reminder that a medication was taken (for example, blister packaging or a computer-aided compliance package). Patients should be advised to take dosages in conjunction with other routine daily activities that are highly habituated and not likely to be skipped, such as at mealtimes or before tooth brushing. Refill reminders

Case Study 19-1

Mr. Jai is a 72-year-old male with a history of hypertension. He comes to the medical clinic today complaining of headaches, tiredness, and fatigue. Upon taking his vital signs, the nurse notes a regular heart rate of 98, B/P 189/92, and normal temperature. In taking his history, you ask about the medications he is taking. He states that he has pills for his blood pressure. The nurse asks him if he takes his medicine every day. He states that he takes part of his medicine every day. When the nurse asks how he does this, he replies that he cuts his medicine into quarters so that the medicine will last longer.

Questions:

1. As the nurse, what would be your plan of care for this patient?
2. How would you address his medication adherence problem?
3. What resources could help you in providing his care?
4. What underlying causes may be present that explain this patient's behavior?

or automatic delivery to the home also can be valuable for the forgetful patient, as can simplification of the dosage schedule, such as changing to a once-daily prescription. Cues or prompts, including phone calls, medication diaries, and medication organizers, are reported to be helpful across multiple age groups. It is crucial that the individual's perception of the environment and his or her view of the feasibility of the support system or aid, such as a medication organizer, be considered. Health care providers should plan with the individual, given they know their adaptive strategies the best as well as what aids they are willing to use. Individuals should be encouraged to monitor "outcome" variables and maintain a medication diary instead of taking medication based on "perceived symptoms," which leads to poor adherence.

Once the initial adherence plan is implemented, follow-up is important to gauge how well the plan is working and whether changes are needed. Therefore, the pharmaceutical care plan must include periodic reinforcement strategies for long-term success. The plan should also be reevaluated from time to time to assess its effectiveness and determine how well it meets patient expectations.

Strategies for Enhancing Adherence to Pharmacotherapy. Although care plans should be individualized, some adherence-promoting strategies tend to be helpful for the majority of patients. Whenever possible, health care providers should strive to:

Promote self-efficacy: Encourage patients to assume an active role in their own treatment plans. In general, the more confi-

dent people feel about their ability to manage a problem, the more likely they will be to take positive action to solve that problem. Involving patients in decisions about their care is important for promoting self-efficacy.

Empower patients to become informed medication consumers: A medication care plan to enhance adherence should first focus on educating the patient and family members or caregivers about the patient's disease and medications. Nurses should provide both written and oral information to address such basic questions as: What is the disease? Which treatments have been prescribed or recommended and why? What is the patient's role in managing the disease? Which adverse effects may occur?

Avoid strategies that could intimidate: Scaring patients or giving them dire warnings about the consequences of less-than-perfect adherence can backfire and may actually worsen adherence. A more constructive approach is to help the patient focus on ways to integrate medication-taking into his or her daily routine. Investigate the individual's belief about his or her medications and their perceived values.

Help the patient to develop a list of short-term and long-term goals: These goals should be realistic, achievable, and individualized. The health care provider can also make "contractual" agreements with the patient to encourage development of constructive behaviors, such as getting more exercise or beginning a smoking cessation program.

Plan for regular follow-up: The health care provider should plan to interact with the patient at regular, usually brief intervals to reinforce the adherence plan. For example, brief appointments can be scheduled when patients visit the pharmacy for prescription refills. The plan should be adapted to the patient's lifestyle and be reevaluated from time to time to adjust for life changes, such as aging or a change in work or school schedules. If possible, the time for counseling on adherence should be separated from the dispensing and pick-up functions.

Implement a reward system: Giving prescription coupons or specific product discounts for successfully reaching a goal in the treatment plan can help to increase adherence, particularly in patients with low motivation.

Although older Americans (aged 65 and older) account for less than 15% of the population, they consume about 33% of all prescription medications and 40% of nonprescription drugs (NCPIE, 2004). Poor adherence in the elderly often leads to additional physician or emergency department visits, hospitalization, and uncontrolled chronic diseases. One study estimated that about 17% of elderly hospitalizations are due to adverse medication reactions—nearly six times the rate in the nonelderly population (Nanada, Fanale, & Kronholm, 1990).

A variety of interacting risk factors increase the risk of nonadherence among the elderly. Risk factors in this population include:

- *Polypharmacy:* Elderly patients are more likely to take multiple medications, including both prescription and nonprescription products. Whenever possible, the medication regimen should be simplified. Health care providers also should consider the extent to which the

mode of drug delivery (e.g., pill, patch, or inhaler) may influence adherence.

- *Physical impairments:* Age-related physical disabilities, such as difficulty getting out of bed or a chair, may limit an elderly person's ability to take medication consistently. Traditional packaging of medication also may be an impediment to some elderly patients; for example, individuals with arthritis in their hands may have trouble opening containers. For these patients, consider options such as unit-of-use packaging, unit-dose packing, or blister packaging.
- *Cognitive limitations:* Memory loss and other cognitive problems may interfere with adherence by causing patients to fail to understand or remember medication instructions (Mallet, 1992). For these patients, health care providers may need to provide medication instructions several times and in different formats, such as both verbal and written information.
- *Limited access to or affordability of health care services:* Many elderly patients are on fixed incomes. Elderly patients who are unable to afford certain medications may be eligible for various forms of state or federal aid, or special discounts from pharmaceutical manufacturers.
- *Low-literacy patients:* Patients who read poorly or not at all are at high risk for poor adherence. According to the U.S. Department of Education Health Literacy Survey (Kirsch et al., 1993), 40 million people in the United States are functionally illiterate and another 55 million are only marginally literate. Patients with low literacy skills are less likely to be adherent to their medication regimens and appointments, or to present for care early in the course of their disease (Malveaux et al., 1996). Patients with low literacy can be taught to color code their bottles with colored tape or to use an organizer that separates daily doses into morning, noon, evening, and night.

Personal Determinants

Genetics

Determinants related to personal factors refer to the biological and genetic impact of the aging process. The rate of aging and maximum lifespan vary among species, and therefore must be at least partly under genetic control (Hekimi & Guarente, 2003; Miller, 2002). Up to 25% of the variation in human lifespan is inheritable (Mitchell et al., 2001); the rest is due to environmental exposures, accidents and injuries, and chance. Very long life, to beyond age 90 years, appears to have an even stronger genetic basis (Perls et al., 2002), which explains why centenarians and near-centenarians tend to cluster in families. At the other extreme, the progeroid syndromes of accelerated aging and death at an early age have known genetic causes (Martin, Oshima, Gray, & Poot, 1999).

However, many genes that are associated with human lifespan are not "longevity genes" per se; for example, mutations in the tumor suppressor genes BRCA-1 and BRCA-2 are associated with breast and/or ovarian cancer (King, Marks, & Mandell, 2003). However, these genes are rare among long-living women, accounting for only 5%–10% of breast and ovarian cancer cases. Conversely, genes that reduce the risk of atherosclerosis may be more common in centenarians; two such genes may have been identified. The first involves a muta-

tion in the cholesteryl ester transfer protein (CETP) gene that leads to larger-sized lipoproteins and a reduced prevalence of cardiovascular disease (Barzilai et al., 2003). The second involves variations in the gene for microsomal transfer protein (MTP)—the rate-limiting step in lipoprotein synthesis (Geesaman et al., 2003). Although such genes may have substantial effects on longevity, they do not appear to modulate the aging process.

In contrast, longevity genes should delay the onset and/or reduce the rate of aging (Pletcher, Khazaeli, & Curtsinger, 2000), perhaps by slowing cellular senescence, improving repair mechanisms, increasing resistance to stresses such as infection and injury, or lowering metabolic rate. These requirements are consistent with the observation that children of centenarians have much lower rates of diabetes and ischemic heart disease, and better self-rated health, than do age-matched controls (Terry, Wilcox, McCormick, Lawler, & Perls, 2003). Therefore, these persons inherited from their long-lived parent a longevity gene, or a set of genes, that protects against these infirmities.

There is evolutionary pressure to select genetic mutations that are beneficial throughout life and that manifest as extreme longevity. But why should evolution select mutations that just increase survival beyond the reproductive years? Indeed, the opposite might be true, because evolution should select mutations that increase reproductive success even if they have adverse consequences later in life. A recent study (Lahdenpera, Lummaa, Helle, Tremblay, & Russell, 2004) has found evidence for the so-called "grandmother effect" (Hawkes, 2003), in which longer survival after menopause increases reproductive fitness among a woman's descendants, because she is available to assist in childrearing.

Psychological Factors

Psychological factors such as intelligence and cognitive capacity are strong predictors of active aging and longevity (Smits et al., 1999). During normal aging, some cognitive capacities (including learning speed and memory) naturally decline with age; however, these losses can be compensated for by gains in wisdom, knowledge, and experience. Often, declines in cognitive functioning are triggered by disuse (lack of practice), illness (such as depression), behavioral factors (such as the use of alcohol and medications), psychological factors (such as lack of motivation, low expectations, and lack of confidence), and social factors (such as loneliness and isolation), rather than aging per se. Other psychological factors such as self-efficacy are linked to personal behavior choices as one ages and in preparation for retirement. Coping styles determine how well people adapt to the transitions of aging. A further discussion of such factors appears in Chapter 9.

Physical Environment Determinants

Physical environments that are safe can make the difference between independence and dependence for all individuals, but are of particular importance for older adults. Hazards in the physical environment can lead to debilitating and painful injuries among older people. Injuries from falls, fires, and traffic collisions are the most common. Chapters 9 and 12 provide additional discussions about these issues.

Safe Housing

Safe, adequate housing and neighborhoods are essential to the well-being of young and old. For older people, location, including proximity to family members, services, and transportation,

can mean the difference between positive social interaction and isolation. Building codes need to take the health and safety needs of older people into account. Household hazards that increase the risk of falling need to be remedied or removed. Strategies for extending independence in the home include the use of handrails in the shower, monitoring devices, elevated commode seats, and an environmental survey for risks.

There is an increasing trend for older people to live alone—especially unattached older women who are mainly widows and are often poor, even in developed countries. Others may be forced to live in arrangements that are not of their choice, such as with relatives in already crowded households. The solution to social isolation may be through social programs developed at the local level for the elderly. Programs on aging have developed alliances with senior centers for facilitating social interaction.

Social Environment Determinants

Social environment determinants include social support, violence and abuse, and education and literacy. These determinants impact quality of life in the elderly by influencing their environment positively or negatively.

Social Support

Social support is an important factor in the promotion and maintenance of overall long-term health by contributing to physical and cognitive functioning and supporting engagement with life (Lange-Collette, 2002). Social support is very influential not only in relation to health behavior, both prevention and treatment, but also in the way individuals with serious medical problems react to and recuperate from various diseases (Hurdle, 2001). For example, one study found that minority women who had stronger social networks and support made greater use of cancer screening methods, mammography, and occult blood examinations than did women with fewer relationships and less social support (Hurdle). Epidemiological data confirm that social support (i.e., strong social networks and high social contact) is related to longevity and mortality (Frisby & Hoeber, 2002); both are related to quality of life.

Another study found that older adults who were socially engaged with others and with their communities and who used additional information resources in solving daily problems demonstrated greater cognitive vitality (Fillit et al., 2002). Conversely, social disengagement in cognitively intact elders was found to be an independent risk factor for cognitive decline. Multiple satisfying social engagement patterns, avoidance of social isolation, and engagement in continuing complex nonoccupational activities appear to support cognitive vitality and be protective against dementia in late life (Fillit et al.). Moreover, these findings suggest that volunteerism and continued participation in the workforce after retirement may play a role in maintaining cognitive reserve and vitality (Fillit et al.).

Seniors who engage in an active lifestyle report an improvement in their social relations (Aranceta et al., 2001). One study found that social function was promoted and maintained when older women on low incomes had access to community recreation. A program conducted to address this issue focused on improving the health of women living below the poverty line, fostered personal and social changes, and involved the collaborative efforts of a municipal recreation department, several community partners, a research team, and these women. Several

positive outcomes were achieved, the most notable being self-reported improvements in physical and mental health, increased participation rates, the formation of new community partnerships, and municipal recreation policy changes (Frisby & Hoeber, 2002). Social interactions, proper nutrition, and physical activity have been found to help maintain healthy behaviors and thus promote optimal aging.

Violence and Abuse

Older people who are frail or live alone may feel particularly vulnerable to crimes such as theft and assault. A common form of violence against older people is elder abuse committed by family members and institutionalized caregivers who are well known to the victims. Elder abuse occurs in families at all economic levels. It is likely to escalate in societies experiencing economic upheaval and social disorganization when overall crime and exploitation tend to increase. Elder abuse includes physical, sexual, psychological, and financial abuse as well as neglect. Older people themselves perceive abuse as including the following societal factors: neglect, violation, and deprivation (WHO/INPEA, 2002). Elder abuse is a violation of human rights and a significant cause of injury, illness, lost productivity, isolation, and despair. Assessment of elder abuse should be conducted with each home visit, physician visit, and emergency room visit.

Families and health care providers should be taught to not disregard any reports by an elderly individual that sound abusive or harmful. Comments such as "I put on the lights and no one comes" or "I called and then finally went to the bathroom by myself" indicate that neglect is occurring. Caregivers also need to have respite care so that they are less likely to become overwhelmed. Also, low levels of neglect, such as inadequate staffing to offer foods and fluids by hand, are common in many licensed facilities. Neglect may also be noted by observing the individual's body and skin for open areas or bruises.

Education and Literacy

Low levels of education and illiteracy are associated with increased risks for disability and death among people as they age, as well as higher rates of unemployment. Education in early life combined with opportunities for lifelong learning can help people develop the skills and confidence they need to adapt and stay independent as they grow older.

Studies have shown that employment problems of older workers are often rooted in their relatively low literacy skills, not in aging per se. If people are to remain engaged in meaningful and productive activities as they grow older, there is a need for continuous training in the workplace and lifelong learning opportunities in the community (Organisation for Economic Co-operation and Development, 1998). Also, patient education material is needed for illiterate elders.

Economic Determinants

Income and Social Protection

Active aging policies need to intersect with broader schemes to reduce poverty at all ages. Although poor people of all ages face an increased risk of ill health and disabilities, older people are particularly vulnerable.

In developed countries, older people who need assistance tend to rely on family support, informal service transfers, and personal savings. Social insurance programs in Germany and Japan, discussed in an earlier chapter, may provide protection to all citizens.

Social Services Determinants

Social services determinants refer to integrated, coordinated, and cost-effective efforts organized to provide health care. Services should include respect and dignity for older persons. To promote quality of life for older persons, health systems need to focus on health promotion, disease prevention, and equitable access to care. Health promotion and preventive strategies need to be designed to reduce the risk of disabilities. Health promotion is the process of enabling individuals to improve their overall health and ultimately their quality of life through behavior management. Prevention is focused on strategies to delay or prevent diseases. The availability of these services influences quality of life.

As individuals age, their risk for disease increases as does the demand for medication used to treat disease. The affordability of medications influences their ability to adhere to treatment interventions and to delay the progression of the disease. Services within communities, such as mental health, long-term care, aging programs, and senior-focused organizations, can provide resources that promote the quality of life among older persons.

Summary

The challenges of the population aging are global, national, and local. Meeting the challenges of improving the quality of life of the elderly will require substantive policy reforms in developed countries and innovative interventions. Promoting quality of life is a multidimensional endeavor. Health care professionals must continuously evaluate programs that can enhance successful active aging. A higher quality of life and active aging is more likely to be achieved by the following behaviors: daily weight-bearing or resistance exercise, appropriate nutritional intake, social support and involvement, participation in medication adherence plans, securing safe environments, and activities that strengthen mental cognitive acuity such as conversations, cards, and puzzles. By focusing on active aging determinants and strategies to increase healthy living, health care providers will aid elders in achieving optimal quality of life.

Personal Reflection

1. Keep a diary for one week identifying all personal choices that indicate you are promoting your quality of life.
2. How do you feel about being involved in smoking cessation for older adults? Are there any groups in your area or at the local university in which you could become involved?
3. What is your opinion about the active aging information presented in this chapter? How could it be useful to you personally? Professionally?
4. How does your culture impact your decisions regarding quality of life?

Critical Thinking Exercises

1. Which determinant of active aging is most influential in healthy aging and why?
2. What approach should be utilized in counseling patients regarding smoking cessation options?
3. If a patient asks you if he or she should start drinking wine every day, how would you respond?
4. What does the active aging agenda support? How can it be used in the care of older adults?

Glossary

Active aging: A program with suggestions from the WHO about how to remain independent and active while aging.

Autonomy: A person's right to choose and make independent decisions.

Independence: A person's ability to direct or carry out his or her own decisions and act autonomously.

Quality of life: How a person rates his or her life as satisfactory or not; best done on a continuum.

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Chapter 20

Teaching Older Adults and Their Families

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LEARNING OBJECTIVES

At the end of this chapter, the reader will be able to:

1. Recognize three principles of adult learning theory.
2. List one issue related to the baby boomers and how they will impact teaching and learning in the next 30 years.
3. Discuss five alternative settings where health education for older adults can take place.
4. Identify one issue related to the impact of cultural diversity on teaching and learning with older adults.
5. Compare how cognitive, affective, sensory, and psychomotor barriers for older adults can affect learning.
6. Discuss strategies for enhancing teaching of older adults.

KEY TERMS

- Adult Learning Theory
- Baby boomers
- Cultural diversity
- Health disparity
- Health literacy
- Lifelong learning
- Third age

The U.S. population is living longer as a result of advances in health care, early treatment and diagnosis of chronic illnesses, technology in disease management, and improved treatments and health care delivery methods. These advancements in health care have resulted in a life expectancy increase from 47 years old in 1890 to 77.3 years old in 2002 (Centers for Disease Control and Prevention [CDC], 2002). With continued developments in science and health care, the number of older adults is expected to grow by 53% in the next 20 years from 35 million in 2005 to 70 million in 2025 (AgingStats.gov, 2005). Those 85 and older constitute the fastest-growing segment of older Americans, and their numbers are expected to triple to close to 10 million by 2025 (Agingstats.gov).

Educating these older adults presents challenges to health care providers. Currently, adults who are 65 and older may have been born in the 1920s, 30s, or 40s—a time when many children did not have the advantage of education, either primary or secondary. On the other hand, the next generation of older adults, those who are considered more affluent, better educated, and healthier (living longer), will soon be reaching the age of retirement (Manheimer, 2002). This group, the **baby boomers** born between 1946 and 1961, are presenting educators and health care providers with specific educational needs that have not been expressed in previous generations. With the changing demographics of the United States, a culturally diverse group, some with low **health literacy** skills, will also be reaching retirement years. All of these factors influence how health care providers must refocus on issues of education in gerontology and the impact on outcomes of health care.

Nurses in all settings are expected to provide education to patients and families. Health care educators in industry, community, rural settings, colleges, universities, adult day care centers, senior centers, hospices, continuing care retirement centers, and assisted living centers (to name a few) are now expected to provide topics of interest not only to the older adult, but also to adults or other family members in the **third age** who are anticipating retirement years. Topics of education may include anything from managing chronic diseases to health promotion, second career choices, exercise, retirement issues, employment issues after retirement, financial issues, legal concerns, and quality of life issues. With this in mind, the purpose of this chapter is to 1) discuss adult learning principles related to gerontological issues; 2) identify the current demographics (related to education) of the older adult and how these demographics will change over the next 40 years; 3) describe the use of technology in the older adult population and how this delivery method can be enhanced for better utility; 4) explain the needs of older adults who wish to be lifelong learners; 5) recognize physical, emotional, sensory, and psychological barriers that may impair learning; 6) examine the impact of **health disparities** and **cultural diversity** issues in the older adult; and 7) identify both current and future implications for health educators of older adult learners.

Adult Learning and the Older Adult

Historically, formal education and learning were considered of little value for anyone over 50 years old. With few people living past the retirement age of 65, education was not considered beneficial. Learning during this time was considered a selfish, self-centered desire. Working

past 65 years old was unwarranted unless financial strains dictated it. Attitudes about learning after a certain age were gauged by how much time was left to live after retirement (Crawford, 2005).

Changes in adult learning began in the post-World War II era when the GI Bill of Rights resulted in millions of veterans being given the opportunity to attend college, promoting the notion that college degrees were not only for the wealthy, but also for the common citizen (Sheppard, 2002). This generation began to change the way adults could learn and introduced the **lifelong learning** approach that resulted in an educational culture change. The increased number of educated adults fostered economic productivity as well as improved quality of life in older adults (Crawford, 2005).

With an increased life expectancy, retirement at age 65 seems to be early in life, with many people living 20 or 30 years past this designated age of retirement. The baby boomers born between 1946 and 1961 account for 80 million Americans, many in the workforce. It is predicted that there will be a labor shortage as the baby boomers start to retire, with many reentering the workforce in second career choices. These events will increase the need for education of older adults (Crawford, 2005). Education for the older adult will also be encouraged by the increasing availability of educational offerings, grants and scholarships, and the change in social norms where lifelong learning is socially acceptable and used for a variety of reasons including education, socialization, and training for new skills. The education needed for this large number of older adults can be done in formal and informal settings, including the community, health care facilities, support groups, colleges/universities, online, and long-term care facilities. Because lifelong learning and education have been correlated with a delay in cognitive impairments with aging, their importance is relevant not only for those reasons mentioned above, but also to maintain quality of life (Diamond, 2001).

Malcolm Knowles's **Adult Learning Theory** (1984), which is commonly used in teaching adults, has motivation and relevance as two key concepts. Using andragogy as a common principle for adult learners, Adult Learning Theory applies certain principles to enhance learning in adults over 18 years old who have completed mandatory public education. Adults expect respect, are autonomous and self-directed, are goal oriented, and need to know that what they are learning is relevant and practical. They expect to actively participate in learning and build on previous life events. Gerogogy involves strategies used when teaching older adults that aim to lead them to higher levels of empowerment and emancipation (Formosa, 2002). Although the needs of the elderly may not be different than those of adults in other age groups (Reynolds, 2005), they may choose to participate in educational activities as a way to apply knowledge immediately, increase personal satisfaction, and improve socialization (Blacklock, 1985). Differences may also be seen when older adults benefit from certain adjustments to teaching methodologies that address impairments in the cognitive, affective, sensory, and psychomotor domains (Reynolds). Adults derive much of their self-identity from past experiences, and nurses should use this knowledge when devising teaching strategies. Fear of failure may also be a concern for this group. Older adults may need extra encouragement to engage in learning activities.

Demographics of Older Adults' Education

In the adult 65 years old and over, 72% report having a high school education and 18% report a bachelor's degree or more (Agingstats.gov, 2005). These numbers do not give an accurate representation of education among culturally diverse racial groups. Only 52% of black older adults and 36% of Hispanic older adults have a high school education compared to 76% of whites and 70% of Asians. The disparity is not as wide for bachelor's degrees or more, with 19% of whites, 29% of Asians, 10% of blacks, and 6% of Hispanics having a higher degree. These statistics indicate that a large portion of minority older adults may have unique teaching and learning needs.

The surgeon general has identified health literacy as a major problem in our health care system, costing up to $73 billion per year (Bass, 2005). Low literacy skills are especially prominent in the minority and older adult community. Health literacy has been defined as "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions" (Institute of Medicine, 2004, p. 1). In a recent study of older adults, 44% of English-speaking Medicare beneficiaries over the age of 65 had inadequate or marginal functional health literacy, compared to 76% of Spanish-speaking older adults. A high prevalence of illiteracy existed for those 85 years of age and older (Gazmararian et al., 1999). In another study, 80% of African Americans 60 years and older had an inadequate functional health literacy (Williams et al., 1995).

The degree of health literacy may impact knowledge, self-reported health status, hospitalization, and health costs (Hixon, 2004). With an increasing number of older adults coming from minority populations, it is important to address these educational issues to improve their health outcomes. Acknowledging low literacy skills can be embarrassing to patients; educators will have to recognize the scope of the problem in their own communities and patient populations and develop culturally sensitive strategies to assist in improving knowledge and enhancing health outcomes. Signs of low literacy skills include noncompliance, incomplete forms, surrogate readers, and vision/hearing problems (Schloman, 2004). Ethical issues include lack of respect for autonomy, potential for harm, allocation of health care resources, and informed consent, to name a few (Erlen, 2004). The challenge remains for health care providers to learn how to address these issues and narrow this gap.

Baby boomers will be more affluent, better educated, and healthier when they reach the age of retirement (Manheimer, 2002). Prior education remains a determinant of demand for education in later years, so a continued increase in educational demands is predicted for this age group (Snyder, Hoffman, & Geddes, 1997).

Needs of Older Adults Who Wish to Be Lifelong Learners

Older adults can continue to learn in a variety of settings. More recently, attitudes about aging have changed positively due to the fact that there is an increasing number of third age elders, or baby boomers, who see aging not as a time of retirement and withdrawal, but as a time in which quality-of-life issues are a priority. This is guiding many groups to conduct preretirement education to assist in the transition to retirement. Although older adults still

expect the traditional retirement, 69% plan to work postretirement in positions related to teaching, office support, crafts, retail sales, or health care (American Association of Retired persons [AARP], 2003). Despite the trends that support postretirement employment, 67% have concerns that age discrimination will be a major barrier in the workplace. If the predicted percentage of baby boomers seek postretirement careers, there will be an increased demand for continuing education.

Older learners prefer teaching methods that are easy to access and require small investments of time and money. They expect learning to begin immediately through direct hands-on experiences. Reading materials such as newspapers, magazines, books, and journals are used by 64% of older adults for learning. The most requested educational topics are listed in **Table 20-1** (AARP, 2000).

Table 20-1 EDUCATIONAL TOPICS ON DESIRED SKILLS

Diet and nutrition
Exercise and fitness
Weight control
Stress management
Complementary and alternative practices
Career advancement
Basic life skills: Reading, writing, math, driving
Hobbies
Community involvement
Volunteering
Arts and culture or personal enrichment
Enjoyment out of life
Educational travel
Spiritual and personal growth
Getting along with others

Source: AARP, 2000.

Many colleges and universities offer tuition-free enrollment in regular courses for older adults. Educational programs are often offered at no charge through alumni organizations, health care facilities, banks, investment companies, museums, labor organizations, recreation centers, and the Internet. Industries are offering workforce-related education and training. In addition, a variety of educational programs are offered for the older adult through national agencies (see **Table 20-2**).

Technology for Older Adults' Lifelong Learning

According to the 2001 Pew Internet Survey on older adults and use of the Internet, 22% of adults 65 and older have used online services (Fox, 2004). The fastest growing group of people learning to use the Internet is those 55 and older. This may be a common method of learning in the near future (Adler, 2002). Of those over 70, 14% said they used the public library for Internet access compared to only 1% for those under 70. Partnering with learners has been shown to improve older adults' learning performance with computers (Zandri & Charness, 1989).

Older adults should have the same opportunities to use information technology, despite the cost and disparity seen in this group (Withnall, 2002). The process of aging may present challenges to older adults (**Case Study 20-1**) who wish to use computers to enhance learning. Some of the problems can be overcome with adjustments to computer technology (see **Table 20-3**) (Bean & Lavin, 2003).

As the baby boomers enter the 65 and older age group, these statistics will obviously change because of their comfort with technology. Prior experience in the use of computers affects attitudes

Table 20-2 Education Programs for Older Adults

Program	Web Address	Description
Elderhostel	http://www.elderhostel.org/welcome/ home.asp	A nonprofit organization dedicated to providing learning adventures for people 55 and over.
Administration on Aging	http://www.aoa.gov	Provides a comprehensive overview of a wide variety of topics, programs, and services related to aging.
FirstGov for Seniors	http://www.firstgov.gov/Topics/Seniors.shtml	Official U.S. gateway to all government information specific to the older adult.
OASIS	http://www.oasisnet.org	A national nonprofit educational organization designed to enhance the quality of life for mature adults; offers challenging programs in the arts, humanities, wellness, technology, and volunteer service, and creates opportunities for older adults to continue their personal growth and provide meaningful service to the community.
Senior Net	http://www.seniornet.org	A 501(c)3 nonprofit organization of computer-using adults (50 and older) whose purpose is to provide older adults education for and access to computer technologies to enhance their lives and enable them to share their knowledge and wisdom.
Shepherd's Centers	http://www.shepherdcenters.org	A network of community volunteer organizations that serve the needs of older adults in four areas: life maintenance, life enrichment, life reorganization, and life celebration.

and outcomes of subsequent training, so the learning needs of the computer literate will change over time (Dyck & Smither, 1994). Telemedicine services are another promising option to educate seniors in distant areas (Adler, 2002).

Seniors can often learn about the computer at public libraries and learning centers that provide access for computer use and education (**Box 20-1**).

Many health care agencies have developed their own Web pages to adapt education for older adult viewers. When developing a Web page for older adults, consider the normal changes of aging and the learning level of the audience. Many Web pages bridge the gaps of health information disparity by offering information in a variety of languages (VanBiervliet & Edwards-Schafer, 2004). Usability issues related to the older adult include design, font size, colors, and clear instructions. Navigation tasks and the format of the Web page may challenge cognitively impaired persons. The organization of

Case Study 20-1

Connie was 70 years old. She always wanted to learn how to speak Spanish and enrolled in the local college, despite the fact that she was beginning to have some hearing problems. She was enjoying her classes as she continued her responsibilities in her home, including caring for her husband who had hypertension. Unfortunately, her husband suffered from a brain attack (stroke) and Connie had to assume the responsibility of primary caregiver for her husband, causing her to withdraw from the university. She did purchase some audiovisuals to help her practice her Spanish. When her husband recovered from his brain attack, Connie was able to reenroll at the university; however, her hearing loss had become worse over time, which made it difficult to continue learning a language in class. Connie decided to continue using books and tapes to learn Spanish, but she also had a new interest in plants and used educational programs on television to learn more about horticulture and working in her yard.

These activities provided Connie with educational activities in the home while continuing to care for her husband, who died 3 years later. After her husband's death, Connie was feeling isolated and decided to go back to the university and continue her learning. She found a cohort of older adults who were also interested in continuing their education in a variety of ways. At this time, Connie was enjoying art and took a class in art history, something she had always wanted to learn more about. Taking this class was not hindered by her hearing loss. She visited art galleries and was involved in group discussions that were run by the class participants. As an older adult, Connie was engaged in a variety of learning experiences that changed over time due to circumstances in her life.

Questions:

1. How has Connie incorporated lifelong learning in the last couple of years?
2. How has she adapted to the challenges she has faced to overcome barriers and continue her lifelong learning?
3. As an educator, what might you recommend to Connie to enhance her education or lifelong learning needs?

the Web page should be consistent, with small segments and simple language. Instructions for multimedia should be clearly stated, and plain text should be available as an option (Eun-Shim, Preece, Resnick, & Mills, 2004). Tips for designing a Web page for older adults are listed in Chapter 13 (National Institute of Aging and the National Library of Medicine, 2002). Applica-

Table 20-3 Problems That Can Be Overcome by Older Adults Using Computers

Age Change	Effect on Computer Use	Possible Solutions
Hearing	Sound from computer may not be heard	Use earphones to enhance hearing and eliminate background noise. Speak slowly and clearly.
Vision	Vision declines, need for bifocal glasses, viewing monitor may be difficult, problems with glaucoma and light/colors	Adjust monitor's tilt to eliminate glare. Change size of font to 14. Make sure contrast is clear. Change the screen resolution to promote color perception.
Motor control, tremors	May affect use of keyboard or control of mouse, may not be able to hold the mouse and consistently click on correct mouse buttons	Highlight area and press Enter. Avoid double clicking.
Arthritis	May not be able to hold the mouse and consistently click on correct mouse buttons	Highlight area and press Enter. Teach how to use options on keyboard.
Attention span	Problems with inability to focus and making correct inferences	Priming—introduce concept early on. Repetition is key to retention. Use cheat sheets.

tion of these principles can be seen at http://nihseniorhealth.gov.

Barriers to Older Adults' Learning

Many adults have unique physical or cognitive difficulties related to learning (Eun-Shim et al., 2004). In 1997, more than half of the older population (54.5%) reported having at least one disability of some type (physical or nonphysical) (Administration on Aging [AoA], 2002). The most frequently occurring conditions reported per 100 elderly persons were: arthritis (49), hypertension (36), hearing impairments (30), heart disease (27), cataracts (17), orthopedic impairments (18), sinusitis (12), and diabetes (10). The percentage of persons with disabilities increases sharply with age. Disability takes a much heavier toll on the very old. Almost three fourths (73.6%) of those aged 80+ report at least one disability. Presence of a severe disability is associated with lower income levels and educational attainment (AoA). In order to facilitate learning and overcome obstacles that chronic conditions may cause, health care providers must have insight into the challenges

Box 20-1 Research Highlight

Aim: The purpose of this study was to evaluate a goal-oriented training approach to teaching older adults how to use computers.

Methods: One hundred and six computer novices were randomly assigned to either the goal-oriented training approach group or the more traditional verbal persuasion–approach group. The ages of the participants ranged from 50–89 years. The goal-oriented group included both verbal persuasion and goal setting with brief individual instruction given by the researcher, and setting goals for certain numbers of spreadsheets to be accurately completed at times during the training.

Findings: The goal-oriented training approach group showed stronger benefits related to computer task proficiency and feelings of computer attitudes/efficacy. Individual differences among participants did not account for significant variation in the outcomes.

Conclusion: The motivational aspects of the training approach should be more of a focus of training when working with older adults. Older adults may learn more efficiently when goal-setting is incorporated into the learning process, at least in relationship to learning unfamiliar computer skills.

Source: Hollis-Sawyer, L. A., & Sterns, H. L. (1999). A novel goal-oriented approach for training older adult computer novices. *Educational Gerontology, 25*(7), 661–685.

that this group faces (Hatcliffe, 2003). Physical changes that can affect learning are listed in **Table 20-4**.

Table 20-4 Physical Changes in the Older Adult That Can Affect Learning

- Reduced vision
- Reduced hearing
- Impaired cognitive function
- Depression
- Stress
- Chronic illnesses

Specific barriers to education may include cognitive, affective, sensory, and psychomotor barriers. Cognitive barriers may include illnesses like dementia and organic brain syndrome. These patients will require courses built upon previous knowledge, and information should be presented in short sessions—no more than 3–5 points per session. A consistent use of terminology with repetition will also help reinforce memory. Affective disorders may include depression and mood disorders. Sensory barriers include hearing loss, glaucoma, and cataracts. Psychomotor barriers may include chronic illnesses like Parkinson's, brain attack, arthritis, and pulmonary diseases that impact the use of teaching tools or computers.

Cultural Diversity and Health Disparities Among Older Adults

The issues of cultural diversity and health disparities cannot be ignored when considering educational issues for older adults. Diversity in terms of age, race, ethnicity, gender, and socioeconomic status are important factors to consider. By 2050, more than one third of the elderly population will be composed of blacks (12%), Hispanics (18%), Asians (8%), and all other races alone or in combination (3%) (AgingStats.gov, 2005). Of note is that the proportion of Hispanic individuals age 65 or older is expected to triple from current population levels. These shifts in the diversity of the older population suggest that there may be social and economic issues related to disadvantaged groups that deserve special attention. There are greater disparities in health care delivery and access to care in later life among diverse groups.

Cultural and racial influences will dictate how and what older adults from minority groups will want to learn (Volland & Berkman, 2004). Of great concern is that many minority elderly do not use English as a first language. With this in mind, many educational Web pages now are offered in a variety of languages. Nurses should educate themselves about the literacy and education levels of all elders in the community in which they serve.

Implications for Gerontological Educators

Education must meet the needs of the older adult—which may change over the next several decades. The older adult cohort is not a homogeneous group, but is composed of persons of different cultures, races, education, and socioeconomic status, all factors that can impact learning. A rapidly growing pool of competent, college-educated adults will soon reach their retirement years. These times will be an exciting period for lifelong learning, which is now viewed as helping older adults improve quality of life and add meaning and creativity to their retirement years (Timmermann, 2003). These needs may also include learning new life skills to manage chronic illnesses (due to increasing longevity), issues related to retirement, health promotion, financial issues, and quality-of-life issues. Educators must address the diverse cultures and needs of these groups.

Education of older adults must be flexible—teaching in a variety of settings with a variety of delivery methods, including one-on-one instruction, (**Figure 20-1**) didactics, and online learning (**Box 20-2**). Working in groups, group discussion, role-playing, and using case studies or simulations may provide methods of engaging older adults in learning. When conducting educational courses, the atmosphere should be conducive to the older adult, including a comfortable temperature, frequent breaks, lack of noise, and accessible bathroom facilities.

In one-on-one teaching sessions with older adults, the nurse should remember to apply the principles of adult learning discussed earlier. Establish a rapport with the person. Ask questions about his or her background so that teaching can draw from the learner's past experiences. Older adults need to have a motivation to learn, so be certain to explain the purpose of your educational session at the beginning. Scheduling teaching time in advance with clear explanations of what will be taught will allow the learner time to mentally prepare and formulate possible questions.

Many times gerontological nurses will present to a group of older adults. As previously stated, this may occur in a variety of settings

Figure 20-1 One-to-one instruction as well as involvement of family members are educational strategies for older adults.

Source: © Jones and Bartlett Publishers. Courtesy of MIEMSS.

including senior centers, independent living, assisted living, churches, support groups, and other social gatherings. Several steps should be taken to assure that the listeners will get the most possible out of the discussion. These appear in **Table 20-5**. Advance preparation is needed to ensure that the program presentation and environment are focused on the older adult audience. Involving learners in the educational process is a good beginning to encouraging participation.

Additionally, remembering to adapt the topic and the ways in which it is presented to accommodate the physical changes and needs of older adults will result in much better outcomes. Advance preparation is key to any productive talk, workshop, or seminar for the elderly. Be sure to consider the physical changes associated with aging by using a microphone, avoiding glare from lights or windows, and speaking directly to the audience to enhance hearing and comprehension. **Table 20-6** summarizes tips for teaching older adults.

There is currently a gap in organizational leadership in older adult education (Manheimer, 2002). There had been no political activism at state or national levels to support educational programs for older adults. Little research on education of older adults, including benefits, cost efficiency, and improvement of quality of life, has been conducted. Specifically, benefits including sustaining cognitive functioning have been largely ignored. An increase in desire for postretirement employment will drive the educational market, and the baby boomers will demand better, more organized education that fits their needs. Nurses who are entering the workforce for the first time need to prepare themselves to meet the unique educational needs of this diverse older group.

Box 20-2
Recommended Resources

American Society on Aging
www.asaging.org

American Association of Retired Persons
www.aarp.org

Association for Continuing Higher Education
www.acheinc.org

Association for Gerontology in Higher Education
www.aghe.org

The John A. Hartford Foundation Institute for Geriatric Nursing
www.hartfordign.org

National Assessments of Adult Literacy
www.nces.ed.gov

National Council on Aging
www.ncoa.org

Osher Lifelong Learning Institute
www.olli.gmu.edu

Table 20-5 Preparing a Short Educational Program for Older Adults

1. Visit the location/facility ahead of time and locate the room where you will speak.
2. Talk to the director of the facility to get a sense of what topics would be most valuable to the audience.
3. Talk to older adults at the site when you make a preparatory visit. Ask their opinions about what topics they would like more information on from a geriatric nurse.
4. Arrange the date and time of the presentation several months in advance so the facility can give seniors adequate notice.
5. Be sure that the date and time do not conflict with regularly planned activities such as Bingo, mealtime, or exercise groups. Try to plan the time around a standing function such as right after dinner (if family members are invited) or right before lunch.
6. Find out how the facility plans to advertise your program. Good suggestions include flyers, community letters, newspapers, announcements at group meetings, signs, and posters.
7. Prepare the material to be presented well in advance. Plan to provide handouts and use multiple audiovisual aids that are elder-friendly.
8. For the educational program itself, employ strategies for teaching older adults (see Table 20-6).
9. Be flexible. Allow plenty of time for participants to gather. Realize that the program may not start exactly on time if the audience needs more time to get settled.
10. Build in time for questions, answers, and the opportunity for older adults to share their stories. Take time to personally visit with the participants after the formal program has ended.

Table 20-6 Strategies for Teaching Older Adults

Use the principles of adult learning theory.
- Assess readiness to learn.
- Involve the audience at the start with questions or stories to which they can relate.
- Draw the participants into the material from the beginning.
- Provide reasons for them to learn by pointing out the significance of the topic using statistics and research.

Use multiple teaching modalities to keep the material interesting and maintain attention.
- PowerPoint slides
- Videos or CDs
- Handouts
- Brochures or pamphlets
- Posters
- Demonstration/equipment
- Quizzes

Remember to accommodate any unique physical needs of older adults.
- Do not stand in front of a window—avoid glare.
- Speak loudly and slowly. Use a microphone if needed. Turn off fans and other distracting noise.
- Face the audience (remember that elders often fill in what they cannot hear by lip-reading).
- Limit programs to about 20–40 minutes.
- Use a room that is large enough to accommodate persons with wheelchairs, walkers, and other adaptive devices.
- Handouts should be in a large font and in black type on white paper for easy readability.
- Keep slides uncluttered; don't provide too much information. Use a large font with an easy-to-see background for slides.

Control the environment.
- Arrange the room to best suit the particular presentation. Be sure the room is large enough for the expected number of attendees.
- Have a helper to assist with seating late-comers without disrupting the program or to help those who must leave during the presentation for some reason.
- Be sure the room is a neutral temperature—not too hot nor cold, and free from drafts.

Make presentations elder-friendly.
- Choose topics of interest to older adults such as living wills, vitamins and minerals, and stroke prevention.
- Create a catchy title for the presentation that will pique interest and curiosity.
- Use lay terms or explain any confusing medical jargon. Define all terms.
- Invite special speakers who are well known in the area to promote attendance.
- Offer prizes, gifts, or some type of take-home item.
- Be sure that handouts are appropriate to the literacy level and cultural background of the group.

Critical Thinking Exercises

1. You have been approached by the director of nursing at a long-term care facility to present an educational program on a "topic of interest" to an expected group of about 10 older adults in assisted living. What topics of interest would you consider? How would you prepare for this presentation? What teaching modalities would you use? How would you adapt the environment to enhance learning for this group? Who would handle advertising of this program?
2. You are a new instructor at a small community college. You have been assigned to develop a service-learning project for an aging class in which the senior BSN students must develop and present a teaching project in local nursing homes. There are 60 students in the class and five facilities available over a 4-month period. How will you divide students into groups and facilities? Would you allow students to choose their own topics, make a list of suggestions, or set this up ahead of time with each facility? What influenced your decision to choose one approach over another for setting up these experiences? How will you evaluate the students' presentations? Is this project reasonable for senior BSN students to undertake? What background and instructions would students need to be successful on this project?
3. On the medical-surgical floor of the hospital where you work as a graduate nurse, the charge nurse asks you to do some one-on-one teaching with a 78-year-old widower who must learn to give himself insulin injections for newly diagnosed Type 1 diabetes. How long do you think it will take for this patient to learn such a skill? What are the factors you would need to assess prior to beginning your instruction? What strategies will you use to prepare for this teaching session? What tools or teaching aids would be appropriate?

Personal Reflection

1. Have you ever cared for an older adult who did not speak English or for whom English was a second language? How did you feel when you tried to explain something to him or her? Did it make you feel frustrated? Did you give up? How was this person's overall health status? How did he or she cope with illness? What could you have done differently to achieve a better long-term health outcome?
2. How do you employ teaching of older adults in your daily nursing care? How important to you is the role of teacher among the nurse's many roles? Have you ever considered a career in gerontological education? If so, how do you visualize yourself 10 years from now in such a position? What type of setting would you most like to work in if your primary job was education relating to older adults?

Glossary

Adult Learning Theory: Developed by Malcolm Knowles, applies principles to enhance learning in adults over 18 years old who have completed mandatory public education.

Baby boomers: People born between the years 1946–1961, after WWII.

Cultural diversity: Ethnic, gender, racial, and socioeconomic variety in a situation, institution, or group; the coexistence of different ethnic, gender, racial, and socioeconomic groups within one social unit.

Health disparity: Differences in mortality and morbidity of illness based on culture and ethnic background.

Health literacy: The degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions.

Lifelong learning: Learning that occurs throughout life, motivated by situational and developmental periods.

Third age: The time of active retirement; a new description of age due to the fact that people are living 20 or 30 years past retirement.

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Section 12

Member of a Profession (Competency 30)

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Chapter 21

The Gerontological Nurse as Manager and Leader

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LEARNING OBJECTIVES

At the end of this chapter, the reader will be able to:

1. Identify characteristics of effective nurse managers.
2. Contrast the roles of manager and leader.
3. Compare various leadership styles and strategies.
4. Distinguish between assertive and aggressive behaviors.
5. Describe the process of delegation, including how it is used in the management of unlicensed assistive personnel.
6. Evaluate one's own strengths and weaknesses as a future leader or manager.

KEY TERMS

- Aggressive
- Assertive
- Authoritarian
- Charismatic leadership
- Delegation
- Democratic
- Intimidation
- Laissez-faire
- Leader
- Manager
- Nonassertive
- Situational
- Transactional leadership
- Transformational leadership
- Unlicensed assistive personnel (UAP)

The nursing profession has changed significantly since the days of Florence Nightingale. Advances in nursing science have required nurses to expand their knowledge base and keep current on constant changes in the health care system. Exciting breakthroughs in patient care occur daily, and with those come greater responsibilities for professional nurses.

Nurse **managers** and **leaders** have additional challenges in caring for older adults with complex needs. As the number of elderly persons in the population increases, so will the number of caregivers who will need to be managed. Nurse leaders in gerontology "must be able to lead at the bedside, in clinical teams, and in management teams" (Mancino, 2005, p. 117). All geriatric nurses, whether they hold a formal manager position or not, need to develop good management skills.

In this chapter, the gerontological nurse as manager and the skills required for effective leadership will be discussed. Characteristics of successful managers and leaders, as well as the concepts of assertiveness and delegation, will also be presented.

Nursing is "the caring and nurturing of the physical, social, spiritual, cultural, and emotional wellbeing of an individual, family and community" (DeYoung, 1981, p. 34). Although the primary aim of gerontological nurse managers is to promote quality of patient care, this goal is accomplished more through faciliation in management than with bedside nursing. Nurse managers in settings involving older adults should focus on implementing, and assisting others to implement, best practices. Although this may seem obvious, education of health professionals and subsequent translation into practice in care of older adults continues to demand attention. As one expert stated, "the infusion of knowledge as to how to create a safer hospital environment for older people has been slow to take hold" (Regenstreif, 1999, p. viii).

When nurses move from a direct care position into management, their focus on patient care shifts to the quality, education, and experience of the staff they supervise, empowering others that provide the hands-on care to patients. Thus, the gerontological nurse manager is in a unique position to improve the quality, positive outcomes, and cost-effectiveness of patient care in a variety of settings.

The Nurse Manager

The University of Iowa defines the nurse manager's basic function and responsibility in this way:

> *The nurse manager provides clinical and managerial leadership to assure that all staff can identify the customers they serve; understand the aim of the work to serve those customers; and has the education, methods and resources to accomplish their performance objectives. Nurse managers develop and direct the planning, implementation, and evaluation of clinical and nursing services within area of responsibility. The area of responsibility might include clinic(s), unit(s), service(s), center(s) and/or program(s). (University of Iowa, 2005)*

Nurse managers are specialists who undertake a multitude of tasks, dealing with others on a daily basis. Nursing care, patient and family satisfaction, staff retention, commitment, and contentment all hold the key to success for the staff involved and for the manager. Job satisfaction produces good nursing care and eventually leads to good public relations and company expansion. Nurse managers have a responsibil-

ity to put methods of satisfaction into place. Weeks (2003) provided an example of the steps used on one unit to attain better patient satisfaction (see **Box 21-1**).

With the restructuring of many health care systems, nurse managers have had to accept more responsibilities that have extended over broader areas. Health care is an ongoing process of learning and putting into practice what is learned. Through trial and error, many nurse managers have forged new territory in the areas of administration and health care. Being a competent nurse manager requires the ability to prioritize, organization skills, and consistency in decisions and treatment of others. The dual degrees of MSN/MBA or MSN/JD being offered at many universities bear witness to the fact that not only are nurse leaders in greater demand, but also the expectations for education are increasingly higher.

Nurse managers contribute to strategic planning of current and future goals of the workplace, whether in regards to a specific unit or the company in general. Management direction needs to be reasonable and nonthreatening. Being a competent nurse manager requires prioritizing, organization, and consistency in decisions and treatment of others.

Sharing in program development regarding the changing needs of the organization is important to meeting the goals of the facility or company.

Characteristics of Effective Nurse Managers

Several character traits of effective nurse managers are listed in **Box 21-2**. Certain qualities of

Box 21-1
Steps to Patient Satisfaction

1. Identify a clear objective.
2. Identify the right people.
3. Identify the right approach.
4. Walk the talk (leaders participating).
5. Role model politeness or PTAs (please, thank you, action, smiles).
6. Involve the entire team.
7. Recognize that little things mean a lot.
8. Convey compassion and pride in work.
9. Practice the satisfaction C's:
   - cheerfulness
   - courtesy
   - cleanliness
   - call-lights
   - coaching
   - collaboration
   - communication
   - commitment
   - confidentiality
   - compassion

Source: Adapted from Weeks, 2003, p. 104.

Box 21-2
Characteristics of Effective Nurse Managers

Organized	Resourceful
Consistent	Professional
Fair	Standard-setter
Optimistic	Trustworthy
Goal-oriented	Honest
Flexible	Empowered
Creative	Nonthreatening

a nurse manager are valuable and may be considered essential in producing effective nursing care (Thompson, 2004). Several of these qualities will be discussed here.

OPTIMISM

An important goal of a nurse manager is to provide a professional, positive atmosphere within the workplace. This includes leading by example. Encouraging a positive attitude among others and modeling it outwardly in word and actions involves constant self-direction of the nurse manager's own thoughts and attitudes. Demonstrating a consistent and upbeat disposition even in stressful situations is essential. Exhibiting a professional attitude and disposition takes time, energy, and willingness of spirit and mind.

Positive reinforcements and redirection when needed are an important part of the nurse manager's job. Staff members who report job satisfaction foster a cheerful environment with contented employees, patients, and families. Behind employee job satisfaction and patient satisfaction is a good nurse manager who guides, influences, encourages, and leads.

PROFESSIONALISM

Setting standards of professionalism is an expectation. Professionalism encompasses the manner of appearance, language, and behavior. The way a manager dresses, speaks, and even his or her posture can influence how receptive others will be to that manager. A manager needs to maintain an image that displays confidence, competency, and completeness of the manager's role. Nurse managers are responsible for maintaining an ethical standard and setting an expectation of the same standard for those whom they supervise. The nurse manager sets the tone for the unit or division and acts as a role model for others.

ORGANIZATION

Being organized, creative, and flexible are necessary traits. Every day nurse managers are faced with many new and complex situations. The function of organizing can be defined as relating people and things to each other in such a way that they are combined and interrelated into a unit capable of being directed toward organizational objectives (Longest, 1976). Health care delivery systems work when an interdisciplinary team performs a variety of skills in a complex care environment. Without organization, events would likely not be completed in a timely manner. Based on the creative, flexible, and organizational skills of the nurse manager, those under his or her supervision will be affected negatively or positively. If the nurse manager keeps deadlines and meets staff expectations, then staff members will generally view this as a priority.

Being organized takes work and determination. Prioritization is essential. Starting each day with a to do list, ranked by order of importance, will help the manager stay on track. There will be days when those priorities will change several times. Keep in mind that everything does not need to be done in one day. Ask "How can I, as a nurse manager, complete my priorities today realistically and completely?"

CREATIVITY

Creativity calls for imagination. Keeping staff involved and excited about work and changes requires the use of critical and creative thinking. An initial role for nurse managers is to encourage the staff to offer their unique ideas and suggestions. Creativity is an art and can be fun. Each person has special ideas and individual ways to improve workplace conditions. Cultivating those suggestions is the responsibility of the manager. Knowing how the staff perceives

the milieu of the workplace and allowing them to express their ideas may help the manager to draw out some hidden gifts of the staff. Perhaps staff members would benefit from more input into scheduling. Indeed, some long-term care facilities allow the staff to make their own work schedules within the parameters and staffing needs set by the manager. Such practices promote a sense of ownership and control within the nursing team and increase job satisfaction.

Flexibility

Daily dilemmas require flexibility. Many times a nurse manager's day will not go as planned; for example, a staff member may call in sick to work, or may have a sick child or car trouble. Those are unexpected situations that require not only flexibility, but also creativity and the ability to reorganize as needed. To keep quality of patient care at its highest level, flexibility will be necessary. Nurse managers would benefit from having a back-up plan to accommodate the unforeseen changes that inevitably happen in the health care environment.

Integrity

Integrity suggests honesty and trustworthiness, qualities that are evident to others over time. This infers that a person is dependable, punctual, fair, and consistent. Patients and families recognize integrity as an important value in society and certainly in health care. Persons of integrity make excellent managers because they earn the trust of others. The supervisors to whom they answer know that patients will be cared for appropriately and safely.

Nurse managers should treat all staff members equally. Staff members look at fairness with high regard (Marquis & Huston, 2003). Showing favoritism will develop a stressful and divided environment. At times, the nurse manager may have to make difficult decisions about staff discipline or termination. Some duties of the manager may be unpleasant but necessary. Managers with integrity will take into account that each person is special, displays specific individual skills, and contributes to the overall goals of the unit.

Skills of Nurse Managers

Gerontological nurse managers will develop a skill set related to accomplishing the goals and objectives of the particular unit they service. Certain skills, such as those summarized in **Box 21-3**, will facilitate more positive outcomes.

Delegating

One skill that all nurses need to develop is that of **delegation.** Nurses do not work in isolation, but are dependent upon the smooth communication and activity of an interdisciplinary team. Charge nurses, nurse managers, nursing supervisors, and directors are all called upon daily to make decisions about those who help them achieve the

Box 21-3 Skills of Nurse Managers

Team building
Maintaining balance in the workplace
Prioritizing
Setting realistic goals
Delegating
Multitasking
Decision making
Excellent judgment
Empowering
Facilitating change

desired outcomes for patient care. Delegation is one of the primary tools used by geriatric nurse managers to ensure the quality of patient care.

Delegation may be simply defined as giving authority to a specific person for a specific task. Delegation is both a managerial and a legal act, and a skill that must be learned and practiced. It involves more than just handing out patient assignments or duties to be performed. It is not abdication of one's own responsibilities. Licensed nurses are still accountable for the well-being and safety of the patients entrusted to them. Thus, when a licensed nurse delegates duties to **unlicensed assistive personnel (UAP)**, such as nursing assistants or nurse technicians, the licensed nurse is still ultimately responsible for the quality of patient care. Kelly-Heidenthal stated: "inappropriate use of UAP in performing functions outside their scope of practice is a violation of the state nursing practice act and is a threat to patient safety. The RN has an increased scope of liability when tasks are delegated to UAP" (2004, p. 103). The nurse can delegate tasks such as bathing, feeding, and toileting to qualified and trained UAP. Although UAP can give supportive care, they cannot lawfully perform nursing duties such as assessment, treatment, or total patient care.

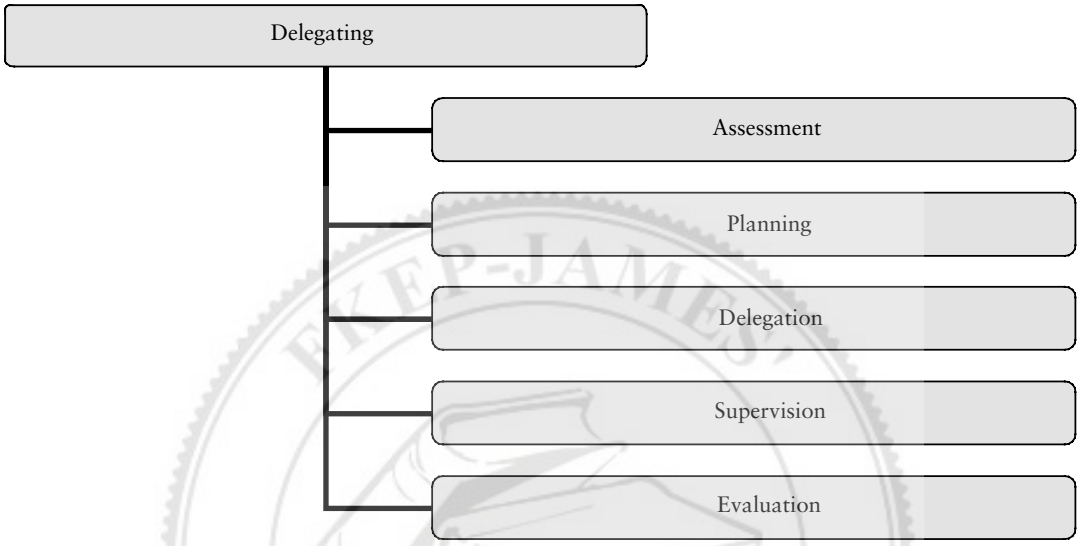
Delegation involves a problem-solving process. Decisions about how and when to delegate duties are complex and involve critical thinking skills on the part of the nurse manager or charge nurse. One study found that the group climate on a unit "was significantly associated with the head nurse's ability to delegate tasks and to make decisions with confidence" (Hern-Underwood, 1991, p. 4). How does one make decisions about delegating care or assigning patients?

The Delegation Process. Delegating is a process that, much like the nursing process or any other critical thinking process, involves several steps: assessment, planning, delegation, supervision, and evaluation (**Figure 21-1**).

The first step in the delegation process is assessment. The nurse manager should examine the situation with which he or she is charged and gather data. This involves more than just looking at a standard acuity form. Questions must be answered, such as: How many patients need to be cared for? What is their level of complexity? What nursing hours are required to provide safe and competent care? Are there any other factors that will add to the duties that the staff will need to perform on this shift? Are there any admissions or discharges? Are any fire drills or other interruptions planned? Does any extra teaching need to be done with family members? Are there any patients whose condition has deteriorated and who might need extra nursing time? Remember that geriatric patients often present with subtle changes in health status that may become emergencies quickly if not properly treated.

After assessing the needs of the patients under her or his supervision, the nurse must assess the available staff. Another set of questions must be asked. Is the staffing adequate? Are there enough licensed professionals per patient based on acuity and other needs assessed? Are the available staff members able and competent to perform the assigned skills? How much supervision will the nursing assistants require? Are any float nurses or assistants assigned to the unit? If so, what is their background and experience? Will the RNs on the unit need to perform any additional duties for LPNs or nurse technicians who are working (such as taking and noting physicians' orders or starting IVs)? What is the scope of practice of the LPNs, nursing assistants, or nurse technicians on duty? The

Figure 21-1 The process of delegating.



nurse manager must realize that each state and each facility may have different skills that are acceptable under different job titles. How much supervision will the unlicensed staff require?

With the answers to these questions in mind, the nurse manager then plans staffing/patient assignments, keeping in mind the five rights of delegation (**Box 21-4**). Planning involves critical thinking in using the assessment data to make the best decision for quality patient care with the resources available.

Once planning is complete, the nurse manager delegates duties to each team member as determined by thorough assessment and planning. Instructions and assignments should be clear and in writing to minimize confusion about job assignments. UAPs should be provided with necessary information about patients in their care in the form of a brief report. Any assignments in addition to patient care, such as replenishing stock or cleaning, should be fairly and evenly distributed and given in writing.

Box 21-4 The Five Rights of Delegation

Right task
Right circumstances
Right person
Right direction/communication
Right supervision

Source: National Council of State Boards of Nursing, 1995.

Nurses should be provided with a written list of patients and their pertinent information. Reports should be given from shift to shift, either by tape recording or in person. Any additional information should be communicated in person during change of shift. Many units tape record reporting to the next shift to save time and free additional personnel to cover patient needs during shift change.

Once assignments are delegated, the nurse manager is responsible for supervising both licensed personnel and UAP to assure that duties are being carried out as expected. Although licensed personnel are responsible for their own actions or failure to act under their scope of practice, the nurse manager who delegates must be accountable for the correct performance of the tasks assigned to UAP. Supervision implies monitoring and evaluating, making changes or suggestions as necessary. The manager must be willing to adjust assignments as the need arises. Education and training of UAP while under the manager's supervision may be needed. UAP should feel comfortable enough with their nurse managers to inform them of any lack of preparation to carry out certain tasks, and of their ability to carry out the delegated assignment.

Lastly, the nurse manager evaluates the entire process of delegation (National Council of State Boards of Nursing, 1995). Evaluate the patient, the person carrying out the task, and how well it was accomplished. Provide feedback at the end of the shift as to how well quality of care was accomplished. This may be as informal as telling the staff they did a good job that day, or it may be necessary to do further teaching in areas of weakness where improvement is needed.

The delegation process is an important one for nurse managers. Without teamwork, quality of patient care cannot be accomplished. Delegating is one skill that all nurse managers need, and one that can be developed with practice and mentoring. **Case Study 21-1** gives an example of the delegation process.

Team Building

Good team building is an essential skill needed by gerontological nurse managers. Caring for older patients is a multitask endeavor with an interdisciplinary team contributing to the safe delivery of quality patient care. Team members may include many levels of nursing staff as well as members from other disciplines such as therapy, medicine, dietary, social work, housekeeping, lab, and pharmacy. In upper management positions, nurse managers may have supervisory authority for those in other disciplines. Good teamwork involves contributing, analyzing, criticizing constructively, and accepting a common ground. Working together toward common goals promotes a sense of team solidarity.

The gerontological nurse manager promotes team building by enhancing each team member's skills and abilities, encouraging individuals to use their skills productively and confidently. Nurse managers need to know the strengths and weaknesses of each team member and demonstrate a concern and interest in each one as a unique individual. To create a motivating climate in the work environment, Marquis and Huston (2003) suggest the following additional strategies: make expectations clear, be fair and consistent, be a firm decision maker, provide experiences that promote employee growth, give positive rewards for desired behavior, and let employees have as much control and independence as possible within the limits of the organization. Creativity, research, and cooperation are all needed to foster each team member's best contributions to the team.

Case Study 21-1

Ms. Brown is the night charge nurse for an inpatient geriatric rehabilitation unit with 30 beds in a small acute care hospital. She is making her night assignments and finds that she has herself, one LPN, and two CNAs to care for 28 patients with high acuity. Ms. Brown does not feel this staffing is adequate, as the evening charge nurse reported that one of the patients was receiving a blood transfusion and might need to be transferred to intensive care, and another patient was complaining of atypical shortness of breath, so tests were being run to determine the cause. The LPN is experienced, but one of the CNAs is still in orientation to the night shift and has little experience.

What is Ms. Brown's best course of action? If she feels she needs more help to provide quality care to her patients, whom should she contact? What should she do if told no more help is available? What is the most assertive response in this situation? How should Ms. Brown divide assignments between herself and the LPN? Between the CNAs? Is there a certain nursing model of care that might work better than another in this situation?

How would Ms. Brown apply the delegation process to this situation?

Goal Setting

A nurse manager sets goals and specific objectives to reach them. Goals are set individually and also collectively as a team or group. Goals should be measurable, realistic, time-limited, and mutually established. In today's society, facilities and companies usually set attainable goals that exceed the previous year's goals. Goals are victory builders. Factors including finances, retention of staff, morale of individuals, resources, and desire to achieve may influence goal attainment. The responsibility of the nurse manager is to set goals and objectives that are realistic and attainable. Staff nurses should be given clear directions as to what is required of them.

Short- and long-term goals should be delineated. Short-term goals could be hourly, daily, weekly, or monthly. Long-term goals are more detailed and may encompass yearly or even longer time spans. Realistic goals are easier to accept and achieve as a team. Goals can be altered based on the needs of the nurses or company, and being an effective manager requires sensitivity and flexibility to those needs.

Facilitating Change

Nurse managers participate in staff and corporate meetings. Maintaining competency related to the current changes within the company and health care in general is a requirement for solid management. Implementing change may be a

challenge. Changes may be instituted based on feedback from the interdisciplinary team members. Change can make an individual feel uncomfortable and vulnerable. When comfort zones are challenged, the nurse manager should provide encouragement, clear direction, and specific expectations. Knowledgeable input about policies and procedures, staffing needs, and financial involvement need to be given on a regular basis. Meetings need to be held to problem solve, assess where the company is as a whole at that given time, and assess the needs of staff members and patients or clients.

For example, a local health care agency may hold corporate meetings weekly. Individual department meetings are generally held once a month. Department issues are discussed and evaluated and changes are made. Think of these meetings like a chain reaction in the following steps—corporate meetings–department meetings–individual needs. Each is important and each has specific objectives, but ultimately the same goal is in the forefront—to make better and achieve more.

Change in the workplace, whether positive or negative, generally produces stress. Going outside of the established comfort zone brings uncomfortable feelings and emotions. But change often provides opportunities, which in turn should produce positive outcomes. How changes are implemented often determines how those changes are accepted. Providing clear direction with any changes will help to reduce the negative responses generally associated with change. "The leader/manager must attempt to view change positively and to impart this view to subordinates" (Marquis & Huston, 2003, p. 90). The stress resulting from change may be minimized by instituting changes gradually. How would you respond to the situation in **Case Study 21-2**?

Stress Management

The nurse manager's most difficult responsibilities are providing stress management and using those skills to manager her or his own stress as well. Stress has a tendency to filter down from one person to another. Each individual may perceive stress differently with different triggers that cause them stress. What one person may see as a negative connotation, another may see as positive. Attitude and individual behaviors determine how stress is managed. Stress may be defined as "any event that places a demand on the body, mentally or physically" (Gmelch, 1982, p. 5).

According to Gmelch in his book *Beyond Stress to Effective Management* (1982), the Chinese have two different definitions for stress. Two different symbols are used in their vocabulary, and they have completely opposite meanings. The first symbol describes danger, and the second symbol describes opportunity. Gerontological nurse managers experience both of these challenges in the workplace, but have the responsibility to choose which perspective should take priority. Which will provide the best outcome? Which will provide the greatest learning experience? Which will draw out the positive attitudes of staff members? Between these two descriptors, opportunity provides more imagination and advantage that could produce new skills and attitudes in staff members. The nurse manager must identify actions to develop a resolution and provide steps to restore energy, calmness, and a spirit of oneness. These steps enable the nurse manager and staff members to be ready for the next challenge with either greater confidence for resolution or trepidation to face yet another stressful situation. Stress is a realistic part of nursing management, but how stress is approached and defined will eventually determine the outcome of the situation.

Case Study 21-2

Ms. Casey, RN, BSN, is the unit manager of a geriatric medical floor in a large acute care hospital. The hospital is introducing a new computerized charting system that requires the staff to attend training to be approved to use it. All of her 44 staff members are required to attend a 4-hour training class within 1 month to prepare for the switch to computerized charting. Most of the nursing staff who have been working on this unit for years are resistant to the idea of a new charting system and wish to remain on the traditional paper and pencil means of charting. Ms. Casey hears many complaints about this change in policy and sees that it threatens morale.

What are some practical ways that Ms. Casey can facilitate change to the new computerized charting system? Can you think of any incentives that might help the staff be more open to this change in policy? How might the resistance of the nursing staff to this change affect morale? Patient care? Devise a plan for how Ms. Casey would be able to send each of her 44 nurses to attend computer class and continue to adequately staff her unit. What problems can you foresee that might arise? Are there any resources that Ms. Casey could use to aid in this transition?

Decision Making and Conflict Resolution

Nurse managers are expected to make intelligent, informed decisions when conflicts arise. Obtaining all of the vital information that explains the conflicts helps to avoid blame and judgment on the part of the manager. Skill is required to deal with conflict and decide a peaceful and fair resolution. Approaching problems in a timely manner and with confidence will assist the staff in realizing that the nurse manager is available and willing to help. How the nurse manager resolves conflict reveals character. Nurse "managers should expect employees to attempt to resolve conflicts among themselves" (Thompson, 2004, p. 64), though staff may require some education in this area. The offer of assistance and the attitude of approaching conflicts as important are necessary for resolution. The staff needs to have support and needs to have confidence that the manager is a resource for solving both minor and major conflicts. Case Study 21-3 provides an example of a situation requiring both decision making and conflict resolution.

Expertise

Nurse managers should have specialized knowledge in the area of expertise of the job. This particularly helps in being able to relate to the staff and set realistic goals for quality of patient care. Someone who doesn't have a good perspective of what the staff deals with on a day-to-day basis will not understand fully how they feel and why

Case Study 21-3

Mr. Gonzalez, RN, is the charge nurse on the evening shift of the skilled care unit at a long-term care facility. The day shift nurses have complained to Mr. Gonzalez that the evening shift CNAs have not been showering the residents as scheduled. They tell him that family members of the residents have complained about poor hygiene of their loved ones.

What is the first step that Mr. Gonzalez should take in resolving this situation? To which staff members does he need to speak? What immediate steps must be in place to remedy this situation? If no action is taken by Mr. Gonzalez and the complaints are true, what could happen? Who has responsibility in this situation for the quality of patient care?

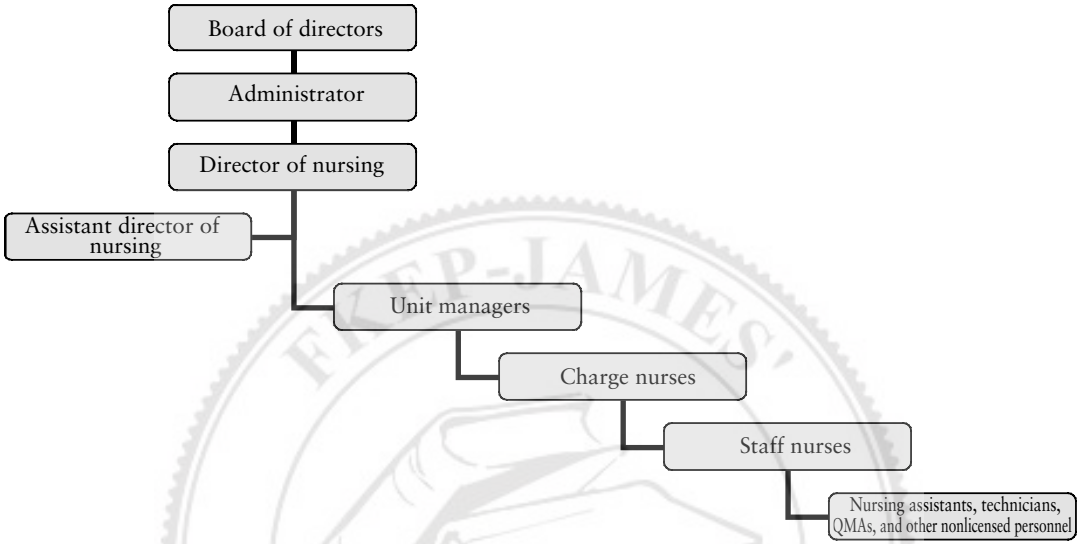
they think the way they do. Nurse managers who have a solid nursing clinical background, which generally includes years of experience in different areas of expertise, may more easily earn the respect of the staff. Respect is difficult to earn if one does not have an equal or more extensive background, knowledge, or experience than the staff. Gerontological nurses wishing to enter into management positions may transition through various levels of increasing responsibility. **Figures** 21-2 and 21-3 give examples of various levels of management in different settings. The benefit of mastering each consecutive level of management and leadership is that the nurse manager can readily identify the needs of her or his staff members as well as the needs of the patients she or he ultimately serves.

Communication

One of the most important skills for nurse managers to master is good communication. By definition, communication is the passing of information and understanding from a sender to a receiver. Clearly, this definition does not restrict the concept to words alone, either written or spoken. Communication includes all methods by which meaning is conveyed from one person to another. Even silence can convey meaning and must be considered part of communicating (Twiname & Boyd, 2002). Effective and correct communication is vital to meeting the everyday demands of the job.

Communication is often classified as verbal (the spoken or written word) and nonverbal (tone of voice, gestures, body language, inflection, and the like). Both are important independently and collectively. Congruence of these two forms of communication is usually displayed through similar words, facial expressions, and body language. Interpersonal relationships are developed among health professionals by way of active and healthy communication. "Through effective communication, nurses and other professionals develop collaborative relationships that enable them to provide well-coordinated, high-quality health care" (Oermann, 1997, p. 139). Nurse

Figure 21-2 Example of an organizational chart in a long-term care facility.



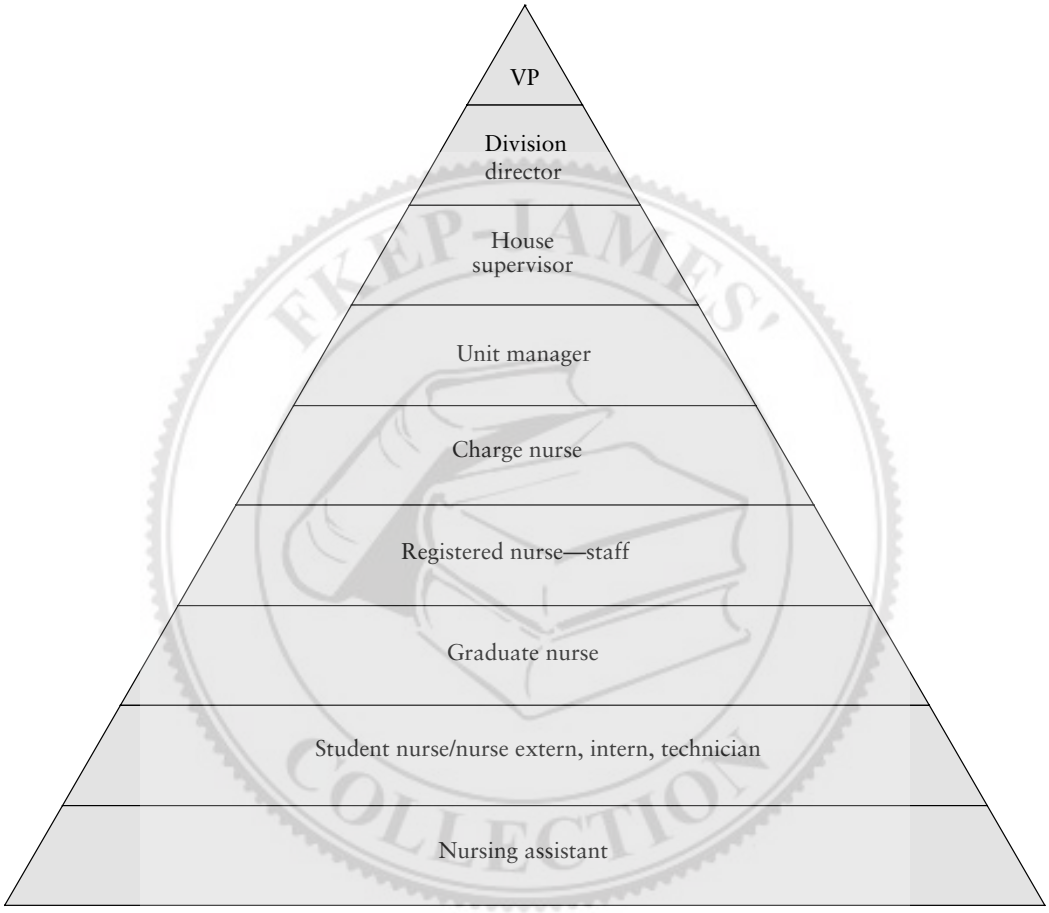
managers should learn to talk with the staff, not at, about, or to them. Positive interactions develop mutual respect. Pointing out the wrong things people do or say is easy, but pointing out those wrong things constructively and with encouragement is the ideal. Case Study 21-3 also gives an example of a dilemma requiring effective communication between a charge nurse, her staff, nursing assistants, and patient families.

According to Beaufort Longest (1976) in his book *Management Practices for the Health Professional,* common barriers exist in communication. Two barriers in particular seem to sum up the cause for effective or noneffective communication. The first barrier is physical. Physical barriers are those things that alter the opportunity for communication to occur. These could include, but are not limited to, time constraints or physical environment. Once the physical barriers are removed or altered, communication can be made easier. The second barrier is psychological, which is a more difficult barrier to overcome. This second barrier takes shape depending on the perception differences of the people involved in the communication relationship. Attitudes and beliefs that are held by the sender or the receiver can determine the effectiveness and response of feedback as well as interpersonal relationships. How one communicates is a reflection of self-image, which determines the image of the sender and reactions of the receiver.

Listening

Listening is an active part of communication. Staff members who have bad, unpredictable days often need a listening ear. Listening is a skill that is learned and practiced, and one that has to be fine-tuned repeatedly. Many assess-

Figure 21-3 An example of logical progression of increasing management responsibilities in a hospital setting.



ments can be made just through listening. The nurse manager needs to provide the individual with his or her undivided attention and good eye contact. The nurse manager must look and act interested. If incongruent nonverbals are displayed, the staff member may feel like the nurse manager doesn't care about his or her needs or personal well-being. Taking the uninterested look and action personally will produce increased lack of communication. The nurse manager must show outward support to prevent staff members from avoiding a future opportunity to communicate when the need arises. Establishing an open door policy will help to instill confidence that the nurse manager is welcoming input and has an attitude of "I am available." To show sup-

port with a simple gesture may be all it takes to provide support and reassurance to a staff member. Staff nurses and UAP need to be allowed to display fears, hopes, and disappointments. With the demands of the fast-paced work arena of today, managers should be careful to remember those who are putting their hearts and minds into helping others each day. Feelings of being overworked and underpaid may come to the forefront. Being a nurse takes a tremendous amount of time, energy, sacrifice, skill, and dedication. As a nurse manager, it is challenging to turn these feelings of being overpowered into feelings of self-worth and empowerment.

Regardless of what type of nurse one chooses to be, one thing remains the same: Nurses are specialized in health care and the ultimate goal is to enhance the wellness of persons through specific knowledge and skills. Despite differences in educational backgrounds, all nurses are important in what they do and how they accomplish the goals set before them. Each should be seen as worthy and with unique contributions to make to the profession.

Inspiring Trust

Inspiring trust is another management skill. Just as a therapeutic nurse–patient relationship requires trust, so does a positive manager–staff relationship. Working together and obtaining open, honest relationships help build trust. Trust takes time to earn. Staff members may need to learn to trust the judgment of the nurse manager. Communicating needs completely and discreetly, allowing room for improvement when errors occur, and practicing positive reinforcements are all tasks needed to build lasting trust.

Settings

Nurse managers practice in a variety of settings, each of which has descriptions and responsibilities related to the specific field of involvement. Gerontological nurse managers are found in acute care hospitals, rehabilitation facilities, nursing homes, assisted living, skilled nursing facilities, and home care. Within these settings, managers may hold a variety of positions, from management of staff to jobs in case management, care coordination, quality assurance, education, or research.

In a skilled nursing environment, for example, the nurse manager is responsible for overseeing the total care of the patients. Individuals involved in the daily care usually include nurses; social workers; physical, occupational, and speech therapists; nurse's aides; and dieticians. The nurse manager must know how and why individual caregivers are involved with the patient. Working in a skilled facility is challenging, and requires organization, interest, and the ability to supervise others under the manager's jurisdiction. The manager or charge nurse is directly involved in the administration of medications, charting, fulfilling doctors' orders, performing daily treatments such as wound care, making sure the patient partakes in ordered therapies, and overseeing the aides' adequate performance of activities of daily living such as bathing, dressing, and grooming.

Nurse managers hold positions of authority regardless of the care setting. Whether acute care, hospital units, dialysis and rehabilitation centers, skilled or assisted living centers, or home care, the nurse manager displays learned skills and professional qualities, and maintains goals.

The Nurse Leader

Leadership interfaces with management, yet there are some distinctions between nurse leaders and managers. Warren Bennis (1989) conducted a

study in which he drew 12 comparison distinctions between managers and leaders. These appear in **Table 21-1**.

A leader is a person who holds a position of authority, who influences people, and who has the ability to direct and guide others. "Leaders have the ability to take people to places they've never gone before . . . successful leaders enroll rather than sell people on their vision" (Evashwick & Riedel, 2004, p. 3).

Effective management requires leadership skills, and effective leadership requires management skills. A way to determine the difference between the two is well stated by Abraham Zalenznik: "Leaders are inspiring visionaries who are concerned about substance, while managers are planners concerned with process" (Wikipedia, 2005). Managers are appointed, but leaders arise from within a group.

Table 21-1 Comparisons between Managers and Leaders

Managers	Leaders
Administer	Innovate
Ask how and when	Ask what and why
Focus on systems	Focus on people
Do things right	Do the right things
Maintain	Develop
Rely on control	Inspire trust
Short-term perspective	Long-term perspective
Accept status quo	Challenge status quo
Have eye on the bottom line	Have eye on the horizon
Imitate	Originate
Classic "good soldiers"	Own person
A copy	The original

Source: Bennis, 1989.

In a survey of 137 women executives, including nurse executives, researchers found that six factors were identified as most important: personal integrity, strategic vision, teambuilding/communication, management and technical competency, people skills such as empowering others, and candor (Carroll & Jowers, 2002). When compared with female leaders in other fields, nurse executives were found to value personal integrity highest among all other traits. These results suggest that higher education that includes the study of ethics would assist nurses in being more effective leaders.

In Britain, the NHS Hospital Trust piloted a new role called Directorate Senior Nurse (DSN), and over a 1-year period engaged a facilitator to guide a small group of DSNs to develop systems of thinking related to leadership, strategic planning, and service planning and development. The results indicated that DSNs felt an improvement in self-awareness and self-esteem that led to increased collaboration and creativity within the workplace (Graham & Partlow, 2002). Certainly, models such as this suggest that nurse leaders may be mentored and trained to be more effective managers and role models.

Florence Nightingale provides a good example of how leadership is developed. Through trial and error she was able to establish safe and effective methods of hygiene to help prevent recurrent death and disease of soldiers. Through many hours of study and diligence in helping others, Nightingale became a noted leading force and developed how nursing issues are dealt with today. Florence Nightingale embodied the characteristics of leadership, but her accomplishments were not without challenges and disappointments. Unexpected outcomes did not stop her from continually trying until success was reached. Eventually, Nightingale's guide-

lines for hygiene practices, better nutrition, and adequate rest for the ill and injured offered hope to those in need and began the journey to modern nursing.

For nurses who wish to take active leadership roles in organizations or within the profession, additional demands are inherent. "Nurses who aspire to formal leadership roles require additional preparation to move into the administrative arenas. In addition to the clinical knowledge and skills, there are business, human resource, organizational behavior, and health care system issues that must be mastered. Leadership is a rewarding and challenging lifelong learning commitment" (Mancino, 2005, p. 117).

Characteristics of Nurse Leaders

What qualities does a leader hold and provide consistently and openly with others? Effective leaders seem to have several qualities in common. **Box 21-5** provides a list of these qualities.

Box 21-5 Characteristics of Good Leaders

Talent and technical/specific skill at the task at hand
Initiative and entrepreneurial drive
Charismatic inspiration—being liked by others and the ability to leverage this esteem to motivate others
Preoccupation with their role—a dedication that consumes much of their life-service to a cause
A clear sense of mission—clear goals—focus—commitment
Results oriented—every action is directed towards a mission—prioritize activities so that time is spent where results will be best achieved
Optimism—very few pessimists are leaders
Rejection of determinism—belief in their ability to make a difference
Ability to encourage and nurture those that report to them—delegate in such a way as people will grow

Source: Wikipedia, 2005.

Leadership Strategies

Two types of leadership exist: **transactional** and **transformational**. According to a study by Dunham and Klafehn (1990), "transactional leaders acted as caretakers who had no vision for the future and no overtly shared values, while excellent nurse leaders had transformational skills and qualities and were perceived to have them by staff" (Moiden, 2002, p. 20). Transactional leadership involves the system of "contingent reward and management by exception" (Moiden, p. 2) versus transformational leadership that emphasized "charisma, consideration, and intellectual stimulation" (Moiden, p. 20). Obviously, transformational leadership produces more positive results in gerontological nursing settings.

According to Marilyn Oermann, based on a study by Bennis and Nanus, transformational leadership involves four major strategies used by successful leaders: "(1) attention through vision, (2) meaning through communication, (3) trust through positioning, and (4) deployment of self" (Oermann 1997, p. 257).

The first strategy enables the leader to see past the present. Based on past experiences, uncertainties, and evaluation of challenges, the leader is able to focus and strive onward toward the goals established, and look beyond the difficulties that are faced. The leader understands

the ever-present changes that exist and uses them to an advantage. Learning is the tool to attain growth and maturity.

The second strategy is based on using good communication techniques to inform and convince others of the same vision the leader has. Everyone has his or her own opinions, which should be expressed openly and with the respect of others. Leaders use this method to get across what is expected from others as well as personally. Achieving follow-through is much easier when others see the leader partake in the tasks with persistence, patience, and excitement. Nurse leaders must reassess when communication is not going well. Keeping focused and keeping the ultimate visions foremost but balanced need to be a priority.

The third strategy leaders use is trust through positioning (Oermann, 1997). In this strategy leaders stand up for what they believe. People working with that leader know where he or she stands on issues of vision. The leader, on the other hand, needs to realize the factors that influence vision, whether from staff involvement or environmental factors.

The final strategy is called deployment of self. Learning is the key to success. With health care changes occurring daily, the nurse leader's responsibility is to educate herself or himself and others. Leaders do not see failure as the end (Box 21-6). Failure is an opportunity to learn and take what is learned to accomplish visions of growth. Leaders are willing to take risks to accomplish the end result. Leadership is an opportunity to provide a style of management that all benefit from. Great leaders not only possess a great vision with deep roots, but also are possessed by the greater vision.

Charismatic style is also involved with transformational leadership (Conger & Kanungo,

Box 21-6 Research Highlights

Aims: To conduct a descriptive study of politicians' and managers' understanding of elderly care in Sweden. The researchers hypothesized that differences in understanding may impact elder care services.

Methods: Researchers conducted interviews with 8 leading politicians and 12 managers in elderly care services. Questions focused on the participants' understanding about caring for older adults.

Findings: Politicians and managers in elderly care had different opinions on how care for the elderly should be developed and produced. Although a willingness to collaborate between politicians and managers of elderly care was found, as were positive attitudes towards care of the aging in various settings, ways of understanding care services lacked clear goals and leadership.

Conclusions: The researchers concluded that although it was possible for politicians and managers to better collaborate and organize care services for older people, the views of older persons needed to be included in the process in order to gain more positive and practical results.

Source: Henriksen, C., & Rosenqvist, U. (2003). Contradictions in elderly care: A descriptive study of politicians' and managers' understanding of elderly care. *Health and Social Care in the Community, 11*(1), 27–35.

1994). Leaders can bring unity to others regardless of turmoil and change. "Charismatic leaders are characterized by their determination to change the current state of affairs accompanied by an awareness of forces in the environment and their followers' needs" (Oermann, 1997, p. 258). There are three stages of **charismatic leadership** involving followers. In the first stage the leader is able to determine the conditions that cause change and recognize followers who will be able to manage those changes. In the second stage the leader encourages followers to partake in the vision and require clear details, direction, and an attitude of excitement towards change. The final stage is the ability and desire to go above and beyond what is expected to achieve the goals established. Dedication and continual commitment is ideal to getting any job done in a timely and effective manner. Keeping focused requires a continual reevaluation of the commitment. Good leaders have the desire to stay the course and finish with satisfaction.

Case Study 21-4 presents a thought-provoking situation of challenge to a nurse leader.

Leadership Styles

Certain leadership styles have been widely recognized, including **authoritarian** or dictatorial, **democratic**, **laissez-faire**, and **situational**.

Authoritarian leadership involves the leader making the decisions with little input from the staff. This type of leadership rarely works well in the interdisciplinary care of older adults.

Conversely, persons with a democratic leadership style welcome the input of staff and generally believe that their opinions and vote are important. This is the notion of the majority rules.

A laissez-faire leader is much more relaxed and tends to "go with the flow." Although this type of leadership might work if the employees are highly motivated and independently able to meet goals and objectives, it is generally considered not to be the ideal leadership style for most long-term nursing situations. One example

Case Study 21-4

Mrs. Petty, RN, BSN, is the director of nursing (DON) for the assisted living portion of a for-profit health care facility. One of her jobs is to hire an assistant director of nursing, a new position created to help the DON with the growing number of residents in their facility.

What qualifications should Mrs. Petty look for in an assistant director of nursing? Describe the ideal candidate for this position. What types of experience, background, and education would be expected in this position? Where does the ADON position fall in the organizational structure of this facility? Where does the DON position fall in the organizational chart?

where laissez-faire leadership might work temporarily is in the case of a faculty or small corporation where a few highly skilled individuals work toward a common goal without the need of a designated "leader" to motivate and inspire. Such challenges come from the group members to each other.

In contrast to these three styles, a person with a situational leadership style will choose the appropriate type of leadership depending on the situation. For example, perhaps democracy works in one situation where a decision does not have a direct negative impact on patients and allows for flexibility, but in another situation the leader needs to be more autocratic or dictatorial because of an immediate change that must be made in order to ensure patient safety and care. A good leader will be able to adjust and adapt to a variety of situations.

Positive and Negative Behaviors

In addition to the desirable characteristics previously discussed, assertive behaviors are associated with good nurse managers. Assertiveness is to be preferred over nonassertive, aggressive, or intimidating behaviors.

Assertive Behavior

Leadership requires **assertive** behavior. How the nurse leader displays assertiveness will determine how others respond to follow through and support. "Being assertive means being positive, direct, and genuine" (Twiname & Boyd, 2002, p. 49). Assertiveness is often associated with progressive and forward behavior. The nurse leader must act reasonably and without judgment. The old adage that "actions speak louder than words" may be a true statement. Nurse leaders hold themselves and others responsible for actions and reactions. Assertive behavior, as described by James J. Messina and Constance M. Messina, appears in **Box 21-7**.

Body language is important in assertiveness. Eye contact is one of the first indications that show interest and true listening. Stating "I am truly interested in what is being said" begins the whole conversation in the right way. Posture, distance, and direct contact are expressions used in most conversations. "Over 65–90% of every conversation is interpreted through body language. We react more to what we think a person meant than to the words that are said" (Warfield, 2004, p. 1). Few individuals know how to read body language. The words used and the emphases placed on those words produce different interpretations. The body language used needs to match the words spoken.

Speaking effectively is also an art. Tone of voice is another form of nonverbal communication. Vocal volume should be at a normal conversational level and without edge, sharpness, or harshness.

The ideal posture when exercising assertiveness is standing or sitting straight at a comfortable distance from the other person (generally 2–4 feet away and outside the other person's personal space). Hand gestures are considered usual in normal conversation. Using relaxed nondirect contact provides for a comfortable conversation. If physical contact in the form of appropriate touch is used, soft minimal contact should be controlled and sensitive.

A final language skill in assertiveness is timing. Trying to talk to an individual when both parties are hurried or stressed will not facilitate proper communication and outcomes. The time and place for a conversation is best at a neutral site and a relaxed time.

Assertive behavior relies on the use of "I" statements and not "you" statements. This al-

Box 21-7 Examples of Assertive Behavior

Standing up for one's rights no matter what the circumstances
Correcting the situation when one's rights are being violated
Seeking respect and understanding for one's feeling about a particular situation or circumstance
Interacting in a mature manner with those found to be offensive, defensive, aggressive, hostile, blaming, attacking, or otherwise unreceptive
Direct, upfront (not defensive or manipulative) behavior; those using assertive behavior confront problems, disagreement, or personal discomforts head on, and their intent is unmistakable to others
Verbal "I" statements, where individuals tell others how they feel about a situation, circumstance, or the behavior of others
Taking the risk of being misunderstood as being aggressive, abrasive, or attacking
Being able to protect one's rights while protecting and respecting the rights of others
Risk-taking behavior that is not ruled by fear of rejection or disapproval but is directed by the rational belief that "I deserve to stand up for my rights"
Rational thinking and the self-affirmation of personal worth, respect, and rights
A healthy style in which to conduct interpersonal relationships
Finding a "win-win" solution in handling problems between two individuals

Source: Messina & Messina. (2005). *Improving Assertive Behavior*.

lows for no blame to be placed intentionally. Assertive responses are more likely to get individuals to change inappropriate attitudes or behaviors. Showing healthy and uplifting behaviors benefits all involved and provides good inward feelings about self. Good behaviors ultimately produce good, helpful outward actions.

Assertive behavior is essential in getting a job done in a time frame that may feel threatening due to the purposes and obligations that have been set. Assertive behavior is positive and allows the individuals to protect their ideas, motivations, and beliefs while at the same time being able to value and respect the ideas and contributions of others without being threatened.

Nonassertive Behavior

Nonassertive behavior is a passive demonstration of how one deals with situations. Taking the back seat or withdrawing to the back of the crowd is common and more comfortable. People who display nonassertive behavior have a tendency to deny or avoid voicing opinions, thoughts, or desires regardless of their value. Individuals are more comfortable allowing others to choose for them than to take the lead to share opinions, thoughts, or desires. Insufficient confidence, guilt, or fear may prohibit contributing quality ideas, often allowing the nonassertive person to avoid conflict, approach the problems, deal with the issues, and come to a conclusion.

Aggressive Behavior

Aggressive behavior can be destructive whereas assertive behavior can be constructive. Aggression involves over-reacting emotionally to a situation. Aggression may arise from the fear of being rejected, embarrassed, or condemned. This type of behavior is turned inward to produce outward boasting of self above others.

Defensiveness may be a response to aggression. The person who is the aggressor also often becomes defensive with his or her actions and believes they are right regardless of the circumstances. Aggressive behavior may include, but is not limited to, sarcasm, insulting, blaming, threatening, and even name-calling (Messina & Messina, 2005a). Having the power to control is the goal of aggressive behavior. There is no option to allow others to have a voice, nor does the aggressor care to hear anyone's opinions or ideas. Aggression is dangerous and self-centered. Controlling others gives the aggressor the edge and makes him or her feel important. In aggressive behavior, image is damaged and the repair can take years to mend, if at all. The best approach in dealing with aggressive people is to provide clear and direct expectations and provide information that aggressive behavior will not be tolerated or encouraged. Putting personal feelings aside while dealing with aggression can be difficult. Personality conflicts do exist, and a good nurse manager/leader knows how to set aside those conflicts and look at the entire picture.

Intimidation

Another negative behavior is **intimidation**, which is directly involved with aggression and should not be encouraged or used as a means to get one's own way. Sometimes other team members will use intimidation as a tactic to influence a nurse's behavior. Case Study 21-5 gives an example of one such situation.

Case Study 21-5

Dr. Smith is the primary physician for most of the patients on the intermediate care unit where Nurse Diaz is working. When Dr. Smith is making rounds, he finds that one of his patients had a fall the night before that was not reported to him. Dr. Smith yells at Nurse Diaz in the hallway in front of family members and other staff that she is incompetent and should have notified him immediately. The fall occurred on the night shift prior to Nurse Diaz's arrival.

What is the most appropriate and most assertive response that Nurse Diaz should make to Dr. Smith? Where should this conversation take place? What should the nurse do immediately to diffuse the situation? What follow-up will need to take place after this scenario? How might this public display affect the attitudes of patients, family members, and staff on this unit? Was Dr. Smith's behavior appropriate? Is there anything that the nursing staff should have done differently? What is Nurse Diaz's responsibility in this matter?

The overall effects of intimidation are negative (Case Study 21-5). Barriers are crossed and raised in work relationships. Accusations take hold from both sides and generally feelings are hurt and relationships are strained. **Box 21-8** lists tactics that may help the nurse manager identify those who use intimidation (Messina & Messina, 2005a).

Intimidation should never be used by those in authority in the health care setting. If a nurse manager unwisely uses intimidation, the ultimate result will be isolation and disconnection from other team members. Feelings of retribution from staff produce uncontrolled anger and negative outcomes. With intimidation, free choice is not an option, and it robs others of the ability to make correct and beneficial decisions that may benefit all involved. Nurse managers must remember that everyone plays a major role in the care of patients and the needs of the families. Intimidation is not a viable behavior for effective nurse leaders or managers.

Summary

In conclusion, both nurse managers and nurse leaders must develop good, safe, and healthy interpersonal relationships. These relationships involve individuals in their care, specifically patients and family members as well as fellow workers and peers. Cooperation, self-control, and experience are vital to achieving positive outcomes. With experience comes confidence, growth in intellect, and stability. Developing the necessary qualities requires the desire to change and maintain a constant state of self-reflection. Being a good nurse manager or leader is an ongoing process that is enhanced by practice and acceptance of constructive criticism,

Box 21-8 Tactics Used in Intimidation

Threatening to use power or control to manipulate others
Using coercion or force
Making oneself seem more powerful than one is
Emotionally distancing oneself from others to appear more powerful
Using verbal and nonverbal cues to scare others into doing a desired behavior
Using negative and even abusive verbal and nonverbal behaviors to get people to comply with one's wishes
Using physical size, stature, and strength to gain respect and obedience
Using punishments such as firing and poor evaluations to manipulate the behavior of others
Using quick temper, anger, or rage to get one's way
Holding your knowledge, level of education, or number of degrees over the heads of others to get them to listen
Acting in such a way as to discourage questions about one's decisions, opinions, or directives
Using money, wealth, or status to hold power over others
Ensuring loyalty by threats of withdrawing support, love, caring, interest, or approval of others
Using dictatorial behaviors to control others

Source: Adapted from Messina & Messina. (2005). *Improving Assertive Behavior*.

frequent changes, and challenges in the workplace. What is learned in the workplace can be carried throughout an individual's lifetime. Achieving goals with confidence by using appropriate behaviors and skills will provide for completeness in the nurse manager/leader's personal life and professional life.

Box 21-9 Resources and Recommended Readings

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Ritter-Teitel, J. (2002). Sail smoother with systems thinking. *Nursing Management, 33*(11), 35–37. www.nursingmanagement.com

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Personal Reflection

1. Where do you presently see yourself in the hierarchy of management in nursing? Where do you want to be in five years? Ten years? What is your ultimate goal related to advancement in your nursing career? Do you have a plan to accomplish this?
2. Is management an avenue that you have considered? What are your personal strengths and weaknesses with regard to the qualities of leaders and managers discussed in this chapter? Do you see yourself more as a leader or as a manager? What leadership styles fit your personality the best? How do you feel about delegating tasks to other nurses and UAPs? What skills do you feel you need to develop in order to be comfortable in a charge nurse position?

Critical Thinking Exercises

1. Examine the organizational chart of a facility where you work or have your clinical experiences. Analyze the hierarchical levels in comparison to the discussion of leadership roles in this chapter.
2. Follow a nurse manager around for a day. Make a list of duties that you observe and what skills seem important.
3. Map out your own personal strategic plan for your career goals. Set goals for 1 year, 5 years, and 10 years.
4. Make a list of your own strengths and weaknesses as manager or leader. Determine which of your weaknesseses you wish to improve upon and how you will accomplish this.
5. Think of a nurse whom you admire as a good role model of a leader or manager. Write down the qualities that you have observed in this person. Compare them to the list in Table 21-1.

Glossary

Aggressive: Using intimidation tactics to achieve personal goals

Assertive: Behavior in which persons are able to defend and protect their own opinions, values, and beliefs and still respect those of others

Authoritarian: A type of leadership style in which the leader dictates the behavior of others

Charismatic leadership: Leading by enthusiasm, empowerment, and motivation of others

Delegation: The process of assessing, planning, delegating, supervising, and evaluating assigned tasks or duties

Democratic: A leadership style in which the staff has a voice, a vote, and an opinion, and the majority generally rules

Intimidation: Using threats, force, or coercion to manipulate the behavior of others

Laissez-faire: "Laid back" leadership style in which the leader allows others to determine the direction and goals of the group

Leader: A visionary person with the ability to motivate others to accomplish goals for the greater good

Manager: A day-to-day coordinator and organizer of activities or care

Nonassertive: Passive behavior shown by not standing up for one's rights or beliefs

Situational: Flexible leadership in which the leadership style is chosen based on context and the needs of the group

Transactional leadership: Leading by an inconsistent system of rewards and consequences

Transformational leadership: Leading by example, encouragement, and empowerment of the staff

Unlicensed assistive personnel (UAP): Staff without licenses, such as nursing assistants

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Chapter 22

End-of-Life Care

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LEARNING OBJECTIVES

At the end of this chapter, the reader will be able to:

1. Identify historical influences and attitudes towards death and dying.
2. Recognize the choices of the elderly and their families in directing their end-of-life care as well as the nurse's role in support/implementation of the patient's choice.
3. Compare curative care, hospice care, and palliative care.
4. Examine the goals/objectives of curative, palliative, and hospice care at end of life.
5. Discuss the nurse's role at end of life using the above concepts of care.
6. Describe the nurse's role as a member of an interdisciplinary team focused on end of life care.
7. Identify the fundamentals of pain and other symptom management.
8. Contrast several psychosocial, emotional, spiritual, and cultural issues that may affect end of life care.
9. Describe some effects of grief and mourning on the elderly.

KEY TERMS

- Addiction
- Advance directives
- Allow Natural Death (AND)
- Analgesic ladder
- Communicating bad news
- Complementary therapies
- Curative care
- Dependence
- Do Not Resuscitate (DNR)
- End of life
- Five Wishes
- Grief
- Hope
- Hospice care

- Interdisciplinary team/group
- Mourning
- Pain scales
- Palliative care
- SUPPORT study
- Symptom management
- Tolerance

Woody Allen once said, "It's not that I'm afraid to die, I just don't want to be there when it happens" (Allen, 1976).

Reality tells us that every person will die. Less than 10% will die suddenly; more than 90% will die after prolonged illness (Emanuel, von Gunten, Ferris, 1999). The accumulation of experiences throughout a person's lifetime helps to clearly define the way he or she wishes to experience his or her own end of life. Familial and cultural factors, along with life events, often provide defining moments that influence a person's choices when facing the end of his or her life and a death that will come sooner rather than later. Anthropologist Margaret Mead was quoted as saying, "When a person is born we rejoice, and when they're married we jubilate, but when they die we try to pretend nothing happened."

This chapter deals with the nurse's role in assisting a patient and family to identify the options for meeting end-of-life needs. It promotes the role of the nurse as a member of a team of professionals who focus on care and treatment of issues specific to the elderly as their health declines. It also offers practical assistance for nurses as they deal with various aspects of end-of-life care.

Historically, education about end-of-life issues and medical needs has been lacking. Initiatives including those by Last Acts and those encouraged by the Robert Wood Johnson Foundation such as Education of Physicians in End-of-Life Care (EPEC), End-of-Life Nursing Education Consortium (ELNEC), and Center to Advance Palliative Care (CAPC) are in place to address the need for additional information and research in this area.

One of the most demanding roles nurses undertake is that of caring for patients near the end of life. Nurses provide the most direct care for patients and families, and also help the family provide care that is competent, comprehensive, and compassionate. Therefore, nurses "must take the lead in integrating palliative and end-of-life care into the daily practice of every nurse, making it a core competency for all nurses who care for people with actual or potentially life-limiting illnesses. . . . Nurses *must* advocate for and deliver this quality care—regardless of specialty" (Rushton, Spencer, & Johanson, 2004, p. 34).

Historical Attitudes Toward Death and Dying

With the advent of ever-increasing modern technology, especially following WWII, dying in the United States underwent a multitude of changes. In years past, Americans frequently lived in multigenerational homes, often in rural settings where living and dying experiences occurred frequently among the animals. Children were exposed to life and death issues as a matter of fact, and grew to be adults having some experience of death before experiencing the death of someone close to them. As the ability to cure illnesses and to prolong life devel-

oped, technology took death to the hospital—to the sophistication of machines, antibiotics, chemotherapy, surgery, and such—and away from the comforts of home and family.

The role of nursing has changed along with the evolution of technology in administering end-of-life care in this country. For the most part, nurses shared the focus toward cure prevalent in the hospital setting. Training to care for the dying patient was linked to the technical aspects of care and the physical preparation of the body after death (Krisman-Scott, 2003). A research and literature review performed by Benoliel for the period 1900–1960 revealed only 21 articles for nurses about caring for the dying patient. "There was little evidence that care of the dying was ever a major concern of nurses in this country" (Quint, 1967, p. 11).

As a result of the changes in our attitudes toward death and dying over time, some have said that the United States is a death-denying society. Kerry Crammer, MD, said: "In the Orient, dying is a requirement. In Europe, dying is inevitable. In America, dying appears to be an option" (Lewis, 2001, p. 24).

This death-denying attitude has created very expensive medical care. Spending on behalf of Medicare beneficiaries in their last year of life is five to six times as much as for other beneficiaries. Medicare expenditures are not distributed evenly across the last 12 months of life, but accelerate rapidly in the last few months, peaking at 20 times the amount for other beneficiaries in the last month of life, as a result of inpatient hospital spending (Hogan et al., 2003).

Even though the expense of medical care at end of life is great, it does not necessarily follow that the needs of the elderly terminally ill are being met. The **SUPPORT study** (the Study to Understand Prognosis and Preferences for Outcomes and Risks of Treatment) conducted over the last decade reported that nurses often were the first to recognize the impending death of a patient (Sheehan & Schirm, 2003). It also revealed that our health care system does not meet either the needs of patients with advanced chronic illnesses or the needs of dying, terminally ill patients (Quaglietti, Blum, & Ellis, 2004). Nor does the care we have come to accept meet the wishes of many Americans who are terminally ill. The National Hospice Foundation's research reports that 80% of Americans say their wish is to die at home. Of the 2.4 million Americans who die each year, less than 25% actually die at home. Of the 800,000 patients who receive **hospice care**, over 75% die at home (NHPCO, 2004).

Recently, dying is beginning to be seen in a newer, more realistic light. Ira Byock, a leading palliative care physician and advocate for improving care at end of life, has linked dying to an ongoing potential for growth. "Dying represents more than a set of problems to be solved; it represents an extraordinary opportunity—an opportunity for review, for restitution, for amends, for exploration, for development, for insight. In short, it is an opportunity for growth" (Kinzbrunner, Weinreb, & Policzer, 2002, p. 259). Instead of growing up, growing old, and dying, Dr Byock suggests we grow up, grow old, and grow on. "Growing on takes place for both the terminally ill aged and their families. And although patients and their families will universally find growth producing deaths as important and positive, it may not be easy. Indeed there are typically many obstacles that must be overcome if the process of death is to unfold in a productive manner" (McKinnon & Miller, 2002, pp. 259–260).

Nurses have the opportunity and ability to influence the process of death by virtue of their proximity to patients and families. Nurses

spend more time with patients and their families at end of life than any other member of the health care team (Ferrell, Grant, & Virani, 1999). Families and patients look to the nurse for support, education, and guidance at this difficult time, yet little education is provided to prepare nurses for this unique type of care. Nurses face end-of-life situations in almost all practice settings, including hospitals, hospices, long-term care facilities, home care, prisons, and clinics, but many remain uncomfortable providing care. Because of the importance of end-of-life care, nursing education is beginning to focus on care at this stage of life (Hospice and Palliative Nurses Association [HPNA], 2004b).

The focus of care at end of life should center on *living* with terminal illness—with medical care, support, and interventions geared toward quality of life and comfort, rather than on prolonging suffering or the dying process—if that is what patient wants. In determining the wishes of patients for end-of-life care, their physical, emotional, psychosocial, and spiritual needs must all be addressed. The cumulative nature of these aspects of a person's life will impact the choices they make at this important time.

Communication About End of Life

Talking about death and dying is often difficult for both nurses and patients. If the nurse doesn't respond in a way that encourages discussion, that discussion will likely not take place, and death will become the "elephant in the room"—something unavoidable and yet taboo (Griffie, Nelson-Marten, & Muchka, 2004).

Perhaps the easiest method of learning about a person's preferences is for the caregiver to simply ask them! However, these conversations are often not held because of fear—the elderly's fear or being perceived as giving up, the family's fear of not wanting the elderly person to think they are wished to be dead, or perhaps the care provider's fear of not knowing what to say or how to discuss bad news. The societal attitudes about denying death are certainly a factor in whether these conversations are held. The National Hospice Foundation Web site notes that most people would rather talk to their children about drugs and sex than to their elderly parents about terminal illness. There are resources designed to assist with these conversations, because *not* having the conversation may prohibit an individual from having the type of care they want, simply because they are not aware of the options.

The Project to Educate Physicians on End-of-Life Care (EPEC), supported by the American Medical Association and the Robert Wood Johnson Foundation (Emanuel et al., 1999), as well as ELNEC, views communicating bad news as an essential skill for physicians. It is also an essential skill for nurses and other **interdisciplinary** team members who interact with the patients and families.

EPEC Project Module 2 presents a six-step approach to **communicating bad news** (Emanuel et al., 1999):

1. *Get started:* Plan what to say, confirm medical facts, create a conducive environment, determine who else the patient would like present, and allocate adequate time.
2. *Find out what the patient knows:* Assess his or her ability to comprehend bad news.
3. *Find out how much the patient wants to know:* Recognize and support patient preference

Box 22-1
Death and Dying: A Simulation Game

This is a very effective guided reflection, with the facilitator reading the scenario, and the participants listening, actively taking part with their responses to the slips of paper and subsequent instructions. The element of surprise is effective if the participants do not know the scenario before beginning the exercise. This exercise often provokes emotional responses, which can then be discussed and processed to incorporate into the learning experience.

Supplies: One packet of 12 slips of paper for each participant
Writing utensil
Overhead transparency of questions for class or small group discussion (optional)

Instructions: Slips of paper can be premarked with the following four topics (3 slips for each topic):

- A person who is very dear to you
- A thing you own that you regard as very special
- An activity in which you enjoy participating
- A personal attribute or role of which you are proud

Verbal instruction by facilitator:
Write one item per topic on each slip of paper.
Arrange the 12 slips of paper in front of you so you can see all of them.
Get into a comfortable position; take a deep relaxing breath.
Listen without comment and follow the instructions given to you while I describe some happenings, some situations, and some people.
(Facilitator should develop the scenario carefully, allowing time for awakening all the senses.)

1. You are at your doctor's office; you hear the diagnosis—cancer.
   Please select and tear up three slips of paper.
   (Allow time [15–30 seconds] for selection and tearing . . . brief pause . . . facilitator or assistant may want to physically collect the papers and deposit them in a wastebasket for greater effect.)
2. You are back at home—who is there? Who do you want to be there? What do you say? What do you want to hear?
   Please tear up another three slips of paper.
   (Provide another appropriate-length pause. Collect and discard.)
3. It is now 2 months later. You are aware your symptoms are worsening and you are feeling weaker. Where are you? What is your lifestyle? What do you continue to do? What can you do?
   Tear up another two slips of paper.

(continues)

Box 22-1: Death and Dying: A Simulation Game (continued)

(Provide appropriate time between each phrase for reflection and for choices of paper to be discarded.)

4. Now, it is 4 months later—you are undeniably ill. The pain has increased considerably. Where are you? Who stays with you? Who visits you? Who are the people you want around you?
   Tear up another two slips of paper (discard).
5. Six months have now passed, and you find that even the smallest activity of daily living takes most of your energy. How do you feel about yourself? Where are you? Who is with you?
   Turn over the last two slips of paper in front of you.
   I will take one of them at random.
   (Facilitator takes one of the remaining slips from each participant and tears and discards.)
6. Facilitator says only: Tear up your last slip of paper . . . you have died.

Discussion and Reflection:
May be discussed in small groups in the class setting.

Personal reflection:

- What issues arose for you from each scenario? Fears? Concerns?
- What were the easiest things to give up? Most difficult?
- What emotional reactions did you have with each scenario? (possibly denial, bargaining, depression, acceptance, avoidance, relief, comfort, anger, feelings of unfairness, sadness with remembered real-life scenarios)
- What did you think/feel/experience when one of the slips was randomly taken from you?
- Did you anticipate the content of the last scenario?
- What were your thoughts/feelings/reactions to tearing up the last slip of paper?

Reflection in reference to the elderly:

- What different issues would arise for the elderly population? Fears? Concerns? (e.g., caregiving issues, financial concerns, being alone, lack of support, physical limitations)
- Might an elderly person have a harder/easier time giving up things in the four categories on the slips of paper? Why/why not for each category?
- Would the emotional responses of an elderly person be different from your own for each scenario? Why/why not?

Source: First used by Hospice of Bloomington in April 1986, provided by Rev. Dick Lentz from St. Vincent's Hospice, Indianapolis, IN; adapted for use with VNA Hospice of Porter County; further adapted for use in this book.

to decline information and to designate someone else to communicate on his or her behalf; accommodate cultural, religious, and socioeconomic influences.

4. *Share information:* Say it, then stop. Pause frequently, check for understanding, and use silence and body language; avoid vagueness, jargon, and euphemisms.
5. *Respond to feelings:* Expect affective, cognitive, and fight–flight responses; be prepared for strong emotions and a broad range of reactions. Give time to react; listen, and encourage description of feelings. Use nonverbal communication of touch and eye contact.
6. *Plan/follow up:* Provide additional tests, symptom treatment, and referrals as needed. Discuss potential sources of support; assess the safety of the patient and home supports before he or she leaves. Repeat the news at future visits.

The Patient Self-Determination Act (PSDA), a federal law, requires health care providers to routinely provide information about **advance directives**. There are several nationally recognized advance directives to help an individual identify their personal wishes in a legal manner and to share that information with the people around them, including medical personnel. Durable power of attorney, living will declaration, appointment of health care representative, **do not resuscitate (DNR)**, and life-prolonging procedures declaration are all legally recognized documents for indicating one's health care wishes.

Additionally, **Five Wishes** and **Allow Natural Death (AND)** offer more recently suggested options for stating end-of-life care wishes. Five Wishes is a movement that encourages people to provide more specific instructions than those offered by a living will, including one's wishes in five categories:

- The person chosen to make decisions when the individual can no longer make them for himself or herself—a durable power of attorney for health care
- The kind of treatment the person wants or doesn't want—a living will
- How comfortable the person wants to be
- How the person wants to be treated by others
- What the person wants his or her loved ones to know

The Five Wishes documents are legal in 38 states and can be used as attachments showing intent in the remainder of states (www.agingwithdignity.org/answers.html).

An AND order is considered a more descriptive and positive order than a DNR. Its focus is on allowing death as nature takes its course at the end of an illness. DNR implies taking something away, or not doing something for the patient, (e.g., resuscitation), and can be viewed as a harsh and insensitive statement of medical care that promotes a feeling of abandonment by patients and families alike. AND provides comfort measures, so that even with the withdrawal of artificially supplied nutrition and hydration, the dying process would occur as comfortably as possible (Meyer, 2001).

Advance directives can also be crafted for specific and personal concerns (e.g., for ongoing care for dependents or a pet). All advance directives should include a periodic review to ensure clarity and to reflect changing needs and concerns. All documents relating to health care should be discussed with physicians, family members, or decision makers and placed in the

medical records held by each of the patient's physicians.

Options for End-of-Life Care

Curative, life-prolonging, and acute care options focus on cure. Despite the findings of the SUPPORT study, there are those patients, families, and cultures who choose the life-prolonging focus of care of a hospital death. Many of these deaths will take place in an ICU setting, with tubes, vents, and devices to prolong life because some cultures promote doing everything possible to preserve life. It is important that judgments not be made about these choices, but to note that other choices exist as well. Options for nonlife-prolonging care at end of life are available and focus on comfort rather than cure.

Hospice care provides one such option, and has the following philosophy:

> *Hospice provides care and support for persons in the last phases of incurable disease so they may live as fully and comfortably as possible. Hospice recognizes dying as part of the normal process of living, and focuses on maintaining the quality of remaining life. Hospice affirms life and neither hastens nor postpones death. Hospice exists in the hope and belief that through appropriate care, and the promotion of a caring community sensitive to their needs, patients and their families may be free to attain a degree of mental and spiritual preparation for death that is satisfactory to them. (NHPCO, 2004)*
> **(Case Study 22-1)**

Eligibility for hospice services is based on a life expectancy of 6 months or less, if an illness runs its normal course. Services are available as long as a patient is considered to be terminally ill, even though it may be longer than 6 months. Hospice utilizes a team approach to address the physical, emotional, social, and spiritual needs of the patient and family.

Hospice care originated in order to provide comfort and dignity at end of life. **Palliative care** evolved from the hospice movement in the 1960s and 1970s. It has become more mainstream as nurses and physicians embrace its philosophy of whole-person care for those persons with life-limiting illnesses who are not yet eligible for hospice support (Bretscher & Creagan, 1997).

Palliative care refers to the comprehensive management of the physical, psychological, social, spiritual, and existential needs of patients. It is especially suited to the care of people with incurable, progressive illnesses (Quaglietti, Blum, & Ellis, 2004). According to a 1997 task force, palliative care has become an area of special expertise within medicine, nursing, social work, pharmacy, chaplaincy, and other disciplines (Task Force on Palliative Care, 1997). The goal of palliative care is to achieve the best possible quality of life for patients and their families. Control of pain, of other symptoms, and of psychological, social, and spiritual problems is paramount (Storey, 1996).

It can be very difficult for a patient and family to choose one of these options for care. A practical suggestion that may help the patient and/or family in weighing the choices is to encourage a frank discussion with the physician, which would include several important questions: "What is the expected outcome if I do treatment option #1? What is the expected outcome if I do treatment option #2? What is the expected outcome if I do neither of these, and

Case Study 22-1

Hospice care is appropriate when the plan of care shifts from cure to comfort. This case study exemplifies this process.

Dee is a 72-year-old woman with advanced chronic obstructive pulmonary disease (COPD) with a history of congestive heart failure (CHF). She has been a patient with a home care agency, receiving nursing and physical therapy services for the past 6 weeks. Dee has been unable to maintain the rigors of physical therapy due to her poor lung status. She is oxygen and steroid dependent, and homebound. Dee is dependent on her husband, Jay, also age 72, for all aspects of her care. He is in need of a knee replacement, but is unable to meet this need due to his caregiving role. Until several years ago, Dee and Jay enjoyed socialization with friends and neighbors, going out to dinner, playing golf and cards, and attending her church on a regular basis. They have a supportive adult daughter who works, lives about 15 miles away, is attentive, and visits nearly every day. Their son lives out of state, calls frequently, and visits on occasion.

Dee voiced to her home care nurse the desire not to return to the hospital, "It doesn't do any good. I'm tired of living this way. Can't we do something at home?" In response to Dee's inquiry, the home care nurse indicates the possibility of hospice care at home because hospice is appropriate for any end-stage illness and because Dee's prognosis was determined to be 6 months or less by her attending physician (according to the National Hospice Organization's guidelines for noncancer diagnoses). For end-stage lung disease, these symptoms include dyspnea at rest, poor response to brochodilator therapy, and other debilitating symptoms such as decreased functional activity, fatigue, and cough. Dee has had multiple hospitalizations for these symptoms without significant improvement in her overall condition. Her appetite is fair to poor; constipation has been a problem; she is short of breath with any exertion and has crackles to bilateral bases, with frequent complaints of mid-back pain. She has 1+ pedal edema; hands and feet are cyanotic. Her current medications include an ACE inhibitor, furosemide 40 mg qd, prednisone 5 mg qd, and O_2 2 lpm/nc. Jay reports Dee is forgetful, and cries "at the drop of a hat." Dee is admitted to hospice care at home.

Questions:

1. As the admitting nurse, what are your recommendations after this initial assessment?

(continues)

2. What team members should be a part of Dee's care plan?
3. How can we determine Dee's goals for her end of life?
4. Evaluate Dee's emotional status; how does it affect her daily functioning? How does it affect her relationship with her husband? How can other team members assist with these issues?
5. What impact do Dee's spiritual life/beliefs have on her condition and functional ability?
6. How might we offer Jay assistance in meeting the physical care needs of Dee?
7. What can be done for Dee's shortness of breath?
8. What should be done for Dee's complaint of constipation?
9. How might one address Dee's back pain?

Suggested Actions/Responses

- The easiest way to determine a patient/family's goals is to simply ask them! Dee is in physical distress, so that is foremost on her mind. Addressing her physical needs first will allow her to be able to identify and concentrate on other goals as her comfort is increased.
- Based on physical and psychosocial-spiritual assessment, Dee and Jay are offered the services of the whole hospice team. They know their individualized plan of care is under the direction of Dee's attending physician and managed by the interdisciplinary team, which includes the services of a hospice-skilled medical director. Although apparently overwhelmed by the admission process, Dee and Jay initially agreed to a nurse, social worker, and home health aide (HHA), and decide to consider a volunteer and chaplain.
- The primary nurse first attends to physical symptoms, because that is often the overwhelming need. Dee's shortness of breath is her primary complaint; after consultation with the attending physician, the nurse received orders to initiate liquid morphine 5 mg q 4 h prn. The nurse instructed and demonstrated the use of morphine to Jay and Dee because he will be responsible for administration of medications.
- Depending on the underlying pathology of Dee's back pain, the liquid morphine may also help this complaint. An NSAID was ordered for possible bone pain.
- Adding opioids contributes to additional constipation, so a stool softener/laxative was ordered on a scheduled basis.
- Because ADLs are an increasing problem, and in light of Jay's

knee pain, hospice can assist with the physical care needs by interventions of on HHA as needed. Stand-by assistance to full bed-bath is available depending on Dee's condition on a given day.

- The social worker often accompanies the admitting nurse for the admission process. This enables the family to be exposed to the "team" from the very beginning, as well as allowing the social worker to hear the patient/family "story" from the beginning, as an aid to assessment. Initial assessment reveals Dee is somewhat tearful in describing her physical decline and realization that her illness is life-ending. However, she is adamant about staying at home, avoiding rehospitalization, and voices several times that she is "tired, not able to fight this anymore. I want to be comfortable. I want Jay to have help."
- When Dee's symptoms indicated she was near death, and when Jay could no longer physically provide her care, she was transferred to the hospice center for the last week of her life. She received around-the-clock **symptom management** and physical care, allowing Jay to change roles from that of caregiver to husband.

choose comfort care?" Weighing the answers to each of these questions may help the individual make an informed choice, based on the differences between the expected outcomes and the individual's own philosophy about how to experience his or her end of life (see **Figure 22-1**).

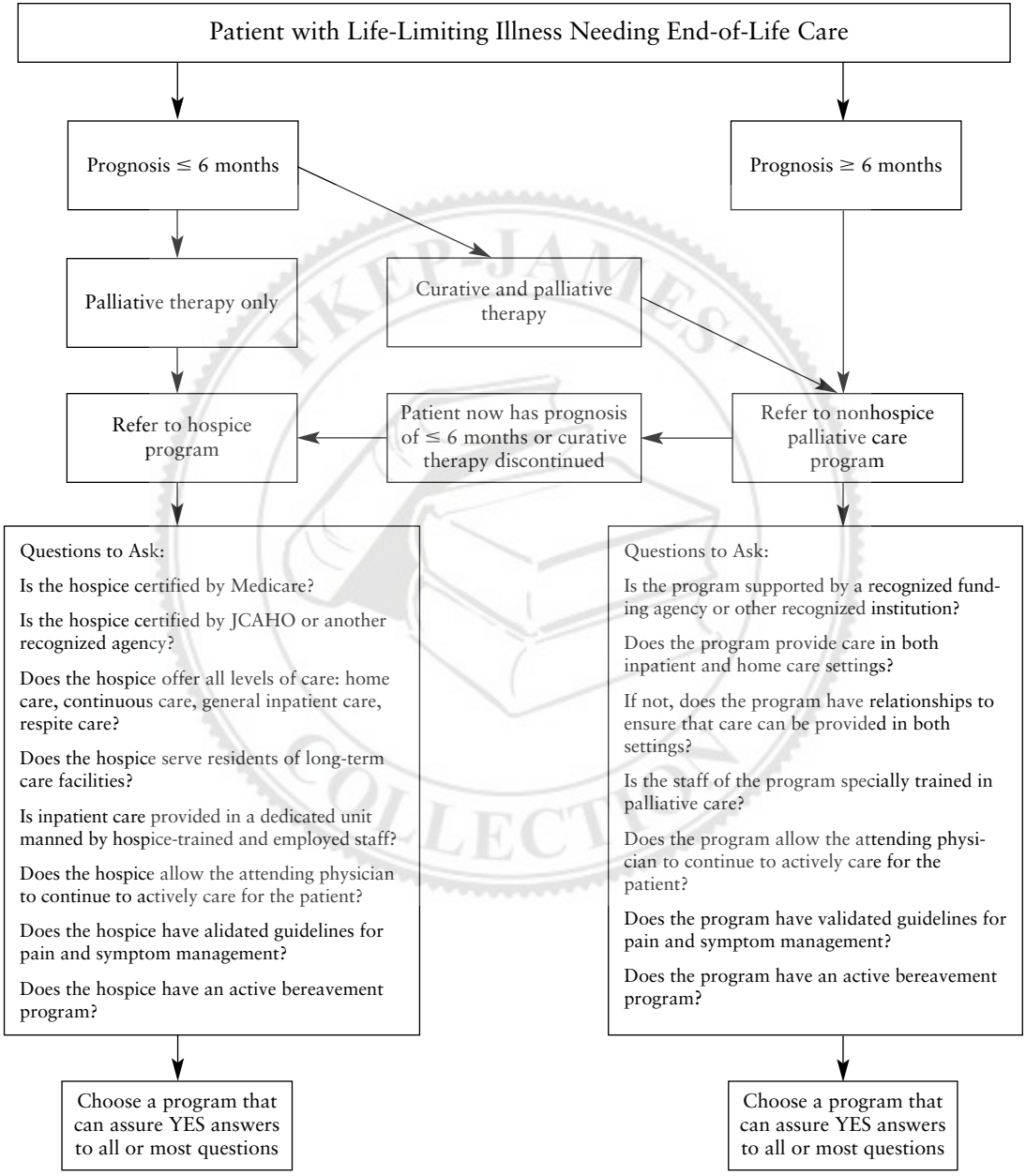
End-of-Life Hospice Care

Cicely Saunders, a nurse, social worker, and physician, started St. Christopher's Hospice in London in 1967. She incorporated a variety of team members to work together to help with the problems of care at end of life. The success of her type of care prompted expansion of hospice services to other parts of the world. Hospice care has existed in the United States since 1974 (Storey, 1996).

The U.S. government, recognizing the cost-effectiveness of hospice care, incorporated hospice benefits into the Medicare program in 1983. Credentialing agencies require that hospices provide all of the mandated services in order to be licensed and/or certified by Medicare and Medicaid and to be recognized by other insurers and some states. Reimbursement to provider agencies is contingent upon this certification (Centers for Medicare and Medicaid Services [CMS], 2004).

According to the CMS Conditions of Participation and standards, hospice services include, but are not limited to:

Figure 22–1 Algorithm for choosing the proper end-of-life care provider.



Source: Kinzbrunner, Weinreb, and Policzer, *20 Common Problems: End-of-life care*. 2002. McGraw-Hill Publishers.

- Nursing services and coordination of care
- Physical therapy, occupational therapy, and speech-language pathology services
- Medical social services
- Home health aides and homemaker services
- Physician services/medical director
- Counseling services (dietary, pastoral, bereavement, and other)
- Short-term inpatient care
- Medical appliances and supplies
- Medications and biologicals

The interdisciplinary group or team (IDG/IDT) provides or supervises the care and services offered by the hospice, including ongoing assessment of each patient/caregiver/family's needs. It is composed of (CMS, 2004):

- Doctor of medicine or osteopathy
- Registered nurse—coordinates the plan of care for each patient
- Social worker
- Pastoral or other counselor

Other team members are required as well:

- Volunteers with training appropriate to their tasks—must contribute at least 5% of all staff hours
- Clergy/spiritual support and counseling
- Additional counseling (dietary, bereavement).

Complementary therapies are not required but are often provided to enhance the patient/family care with services such as massage, healing touch, music therapy, pet therapy, and others. Many of these additional therapies are provided by volunteers skilled in these particular areas.

Focus on Symptoms

Among the nurse's primary responsibilities as a member of any interdisciplinary team is to coordinate the patient's care and to assist with management of the patient's symptoms. The remainder of this chapter will provide practical assistance with managing the variety of symptoms frequently encountered at end of life (**Case Study 22-2**).

Physical, Nonpain Symptoms

Respiratory

Dyspnea means a distressing difficulty in breathing. It is a symptom, not a sign. A patient may have difficulty breathing and have no abnormal physical signs. Dyspnea, like pain, is whatever the patient perceives it to be. Episodic shortness of breath is sometimes due to hyperventilation. Any patient with dyspnea is prone to episodes of anxiety or panic. The goal of treatment for terminal dyspnea is to relieve the perception of breathlessness (Enck, 1992).

Opioid therapy is used to treat shortness of breath. Morphine reduces the inappropriate and excessive respiratory drive. A low dose is usually very effective—liquid morphine 2.5–5 mg PO every 4 hours is a good starting dose. It may also be given subcutaneously at one third the oral dose if the patient is unable to swallow. It reduces inappropriate tachypnea (rapid breathing) and overventilation of the large airways (dead space). It does not cause CO_2 retention, and can reduce cyanosis by slowing ventilation and making breathing more efficient. Morphine does not depress respirations when used judiciously and titrated appropriately. For patients who do not tolerate morphine, other opioids such as oxycodone and hydromorphone can be used (McKinnis, 2002).

Case Study 22-2

Despite studies showing the majority of people would prefer to die outside the hospital setting, there are those who find comfort in a more structured environment. Death in the hospital need not be a terrible or frightening event, as evidenced in this case study.

Jake is a 90-year-old male, diagnosed with end-stage dementia. He has been living in the home of his daughter and son-in-law, who are retired and in their 60s. His daughter is a power of attorney–health care representative. He has a living will in which he indicates an intentional nondecision about artificially supplied nutrition and hydration. In the past 2 years, he has become progressively weaker, unable to ambulate, unable to carry on a meaningful conversation, and increasingly incontinent of bowel and bladder. He was admitted to the hospital with dehydration and lethargy. A hydration IV has been started at 75 cc/hr. The physician has mentioned the possibility of a G-tube for feedings if the family so wishes. The CNA reports Jake moaned when she turned him during his bath, and he did not arouse when she attempted to feed him his breakfast.

You are the nurse caring for this patient. The daughter is in a quandary, stating "I don't think Dad would want a tube in his stomach, but he never told me that for sure. My brother thinks we should do it so dad doesn't starve to death. I tried to feed him his oatmeal this morning, but he seemed to choke. He's been coughing when he eats for a couple of months now." Your physical assessment reveals crackles throughout the lung fields, respiratory rate of 44 breaths per minute, edema to lower extremities, decreased level of consciousness, an irregular apical pulse, and a blood pressure of 76/48.

Questions:

1. What active symptoms affect the decision making for Jake?
2. What quality-of-life issues might also be involved in the decision making?
3. How would you help Jake's daughter understand the benefits and burdens of tube feedings?
4. How would your hospital-based team address the son's differing opinion?
5. What treatment would be appropriate for Jake's pain? His shortness of breath? The crackles in his lungs?

Suggested Actions/Responses

- Jake's symptoms clearly indicate an end-of-life process. You notify the physician of the family's quandary and request permission to set a family meeting for discussion of all the issues, including his terminal status.
- In answering the daughter's questions about G-tubes, you explain to her that sometimes a G-tube may be beneficial when the outcome is uncertain—for example, when there is potential for recovery as in a car accident or after a CVA. Dementia is a progressive disease, with little hope for improvement, and with an expectation of terminality at some point in time. When fluids are added to a failing body, the burdens may outweigh the benefits. These burdens might include increased congestion, edema, and nausea.
- The hospital social worker and/or chaplain might explore Jake's son's fears and feelings about Jake's end-of-life status. Quality-of-life issues might also be discussed, in order to ascertain the importance of this family's cultural background in their decision making.
- Jake's nonverbal cues of pain must be addressed. Because dementia patients are often unable to report pain or its location, it is important for the nurse to observe behavior and treat appropriately. Because Jake is having difficulty swallowing, oral medications are not feasable. A low-dose opioid by IV or SQ route would be appropriate.
- The low-dose opioid initiated for pain would help with his shortness of breath; supplemental oxygen may also be of benefit. Lowering or discontinuing the IV rate could improve the congestion and edema. The addition of hyoscine could also be helpful.

Anxiety can be precipitated by the fear of suffocation, which worsens the perception of dyspnea, creating a vicious cycle. Antianxiety agents, such as lorazapam 0.5–2.0 mg every 4–6 hours PRN, will help with restlessness and thus often decrease respiratory effort. It can be given PO, SL, bucally, or rectally (McKinnis, 2002).

Oxygen may not be effective if hypoxemia is not the cause of dyspnea, but may have a placebo effect and decrease the individual's anxiety. O_2 should be started at 2 l/nc; increase to 4 l/nc if needed.

Other helpful and practical techniques might include:

- Head of the bed elevated 30–45 degrees
- Cool, humidified air
- Relaxation techniques
- Fan at bedside or ceiling fan

Excess secretions, resulting from fluid overload from artificial hydration or from increasing inability to swallow secretions, allow a buildup in large airways, causing a rattling sound. This rattle may be more distressing to the family at

bedside than uncomfortable for the patient. Scopolamine TD or SQ or hyoscyamine SL may be helpful in treating this condition (McKinnis, 2002).

Gastrointestinal

Constipation results from a variety of causes for persons at end of life. Nonmedical causes include inactivity and decrease in food and fluid intake. Exercise contributes to bowel motility, but persons with life-ending illnesses are often incapacitated by their disease processes. Medications used to control pain almost always have a constipating effect. Rather than withholding opioids, the constipating side effects of the medications must be treated. A combination softener/stimulant should be used, because use of a softener alone could lead to a soft impaction. Legend indicates that Dr. Cicely Saunders (mother of the modern hospice movement) gave a lecture in which every fourth slide read, "Nothing matters more than the bowels!" (Levi, 1991).

Nausea/vomiting, while common at end of life, it may have multiple causes. Treatment of choice depends upon which of four areas of the brain are stimulated. One or more of these areas sends a message to the vomiting center located in the mid-brain, causing emesis. For this reason, a combination of medications may be required to control nausea and vomiting. Storey (1986) lists the following four areas:

1. Cerebral cortex
   - Stimulated by overwhelming visual, sensory, or cognitive input
   - Anxiety—may control with lorazepam
   - Brain metastases (due to intracranial pressure)
   - May respond to dexamethasone
2. Vestibular apparatus
   - Inner ear responsible for motion sickness (e.g., infection or Meniere's disease)
   - May respond to cyclizine, meclizine, or hyoscine
3. Chemoreceptor trigger zone (CTZ) (Most common causes of nausea are mediated by this route)
   - Triggered by uremia, hypercalcemia, chemotherapy, and certain drugs
   - Mild—may respond to hyoscine patch or promethazine
   - More severe—may respond to prochlorperazine suppository or a more potent CTZ antiemetic like haloperidol
4. Gastrointestinal tract
   - Caused by noxious material in stomach, peptic ulcers, severe constipation, or bowel obstruction
   - "Squashed stomach syndrome" or bowel obstruction—may respond to halperidol
   - Delayed gastric emptying—use metoclopramide

Anxiety and Delirium

Anxiety at end of life can be caused by a variety of factors. Loss of control, loss of self-esteem, and loss of independence can be very distressing to a person who has previously been autonomous. A change in environment for the dying person may add to the anxiety. These changes may be large—as in a family caregiver, a place of care, or meeting new professional staff—or small, such as a change of bed or medication. Treatment for anxiety includes relieving physical symptoms that may be present, such as pain or shortness of breath. The simple presence of someone the dying person

trusts can be very reassuring. Antianxiety medications may also be used in conjunction with these interventions (Wright, 2002).

Delirium is a fluctuating cognitive disturbance, characterized by changes in mental status over a short period of time. It occurs in the last hours to days of life in a large percentage of dying patients. Delirium is especially devastating to family and friends because it can stand in the way of meaningful conversations and goodbyes. The most common physical causes may include dyspnea, pain, constipation, or urinary retention, all of which can be treated. Environmental comfort can be provided by reducing stimuli, reorientation if possible, familiar persons at bedside, and interdisciplinary team members providing emotional, social, and spiritual support. Music therapy, therapeutic/healing touch, and nonmedical nursing interventions should be considered. Antianxiety medications, used cautiously, may also be helpful.

Nutrition and Hydration

Declining appetite is a natural occurrence in the process of dying. This concept is one of the most difficult for caregivers to embrace, because our society tends to equate love with provision of food. When end of life nears, the body is less active and requires less nourishment. From the patient's perspective, food does not taste the same, so favorite foods may no longer provide comfort; appetite is easily satisfied by bites of food rather than regular portions. Caregivers should be encouraged to offer small amounts of a variety of foods. When a patient clenches his or her teeth with feeding attempts, it may be his or her way of exerting control.

The attempt to *artificially hydrate* may be detrimental to comfort, because the failing body may not be able to process the added fluids, contributing to fluid overload. Thirst may be satisfied by providing small amounts of oral fluids, popsicles, or ice chips. Dry mouth may be successfully managed with meticulous mouth care (Kinzbrunner, 2002).

Physical, Pain Symptoms

Issues Pertinent to Pain in the Elderly

Albert Schweitzer said, "We all must die. But if I can save him from days of torture, that is what I feel is my great and ever new privilege. Pain is a more terrible lord of mankind than even death itself."

Pain in the elderly is particularly problematic. "Unrelieved pain can contribute to unnecessary suffering, as evidenced by sleep disturbance, hopelessness, loss of control and impaired social interactions. Pain may actually hasten death by increasing physiological stress, decreasing mobility, contributing to pneumonia and thromboemboli" (HPNA, 2004a). Underreporting of pain is common, because the elderly learn to expect chronic pain and accept it as part of growing older. They may minimize pain to avoid diagnostic testing or to protect families or themselves against a poor prognosis. They may also use softening words, such as *discomfort, soreness,* or *aching* instead of the word *pain*. In addition, health care providers may tend to underestimate and undertreat pain in this population, for fear of promoting addiction to pain medications.

Research has shown that approximately 25%–50% of community-dwelling elders have significant chronic pain, and between 45% and 80% of nursing home residents have undertreated, substantial pain. The pain of those in nursing homes is generally "underappreciated, underreported and undertreated" (Ferrell, 1991, p. 2).

Additionally, McCaffery and Pasero (1999) identify that there are many misconceptions about pain in the elderly.

- Pain is a natural outcome of growing old.
- Pain perception or sensitivity decreases with age.
- If an elderly person does not report pain, he or she does not have pain.
- If an elderly patient appears to be asleep or otherwise distracted, he or she does not have pain.
- Potential side effects of opioids make them too dangerous to use to relieve pain in the elderly.
- Alzheimer patients and others with cognitive impairments do not have pain, and their reports of pain are most likely invalid.

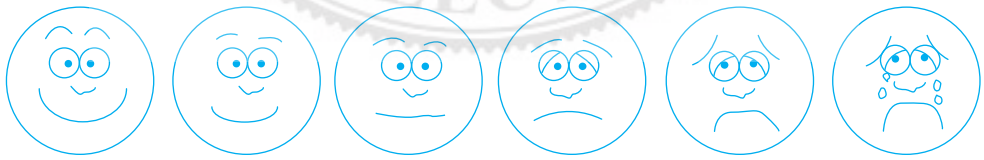
It is important that nurses recognize the many facets of pain in older dying adults. The plan of care should be guided by consideration of physical, psychological, and social aspects of pain. This interdisciplinary plan should evolve over time, in response to the patient's changing needs (Gibson & Schroeder, 2001).

To successfully treat pain, the nurse must be able to assess the pain of the individual. "Pain is whatever the experiencing person says it is, existing whenever he says it does" (McCaffery, 1968, p. 95). However, individuals may require assistance in describing their pain. A commonly used **pain scale** is in **Figure 22-2**.

Treatment of pain in the elderly is very effective when based on a basic understanding of origins of pain and a systematic approach to treatment. Different types of pain require different treatments. Sometimes a combination of pain medication and adjuvants (such as antidepressants or anticonvulsants) can be more therapeutic than each used alone.

Pharmacological interventions remain the first line of treatment for unrelieved pain. Opioids are needed when pain does not respond to nonopioids alone. Some clinicians and patients avoid opioids due to fear of addiction. Nurses need to be able to understand and explain to patients and families the difference between addiction, tolerance, and physical de-

Figure 22–2 Wong-Baker FACES Pain Rating Scale.



Source: From Wong, D. L., Hockenberry-Eaton, M., Wilson, D., Winkelstein, M. L., Schwartz, P.: *Wong's Essentials of Pediatric Nursing, 6/*e, St. Louis, 2001, p. 1301. Copyrighted by Mosby, Inc. Reprinted by permission.

pendence. Fear of addiction should not be a factor in pain control. The findings of several studies have shown that addiction as a result of using opioids for pain relief occurs in less than 1% of patients (McCaffery & Paseo, 1999) (**Box 22-2**).

Pain is divided into two major physiological types—nociceptive and neuropathic. Nociceptive pain is further divided into two types, somatic and visceral.

Somatic nociceptive pain typically involves the following symptoms and treatments:

- Tissue injury resulting in stimulation of afferent nerve endings.
- The skeletal system, soft tissue, joints, skin, or connective tissue.
- The patient typically can localize the pain, may be able to point with finger to area; may describe as dull, aching, throbbing, or gnawing in nature.
- Best treated with NSAIDS and partially responsive to opioid therapy; may require a combination.
- Examples: bone fracture, bone metastases, muscle strain.

Visceral nociceptive pain typically involves the following:

- Activation of nociceptors
- Internal organs
- Patient often unable to localize, may use an open hand to show area affected, because pain may be diffuse
- May describe as deep, aching, cramping, or sensation of pressure
- Very responsive to opioid therapy
- Examples: shoulder pain, secondary to lung or liver metastases

Box 22-2
Research Highlight

Aim: This study attempted to evaluate the suffering of terminally ill dementia patients over time, from admission to the hospital until death.

Method: The study included consecutive end-stage dementia patients who were dying in the hospital. Using the Mini Suffering State Examination scale (MSSE), 71 patients in a 2-year period were evaluated weekly for level of suffering.

Findings: Using the MSSE scale, 63.4% of patients died with high levels of suffering, and 29.6% died with intermediate levels of suffering. The level of suffering actually increased during the hospital stay, which averaged about 38 days. Seven percent of patients died with a low level of suffering. The most significant aspects of suffering included restlessness, pressure sores, nutritional issues, and medical instability.

Conclusion: Despite traditional nursing and medical care, a significant portion of dying dementia patients experienced an increase in suffering as they approached death. New palliative measures need to be developed for dying dementia patients.

Source: Aminoff, B. Z., & Adunsky, A. (2004). Dying dementia patients: Too much suffering, too little palliation. *American Journal of Alzheimer's Disease and Other Dementias, 19*(4), 243–247.

Box 22-3 Tolerance of and Physical Dependence on Opioids

Tolerance of opioids and physical **dependence** on opioids are not the same as **addiction** to opioids, but these three terms are often confused. Following are the definitions used by the American Pain Society (1992):

- Opioid addiction is psychologic dependence. It is "a pattern of compulsive drug use characterized by continued craving for an opioid and the need to use the opioid for effects other than pain relief" (McCaffery & Pasero, 1999, p. 50) or for non-medical reasons. In other words, taking opioids for pain relief is not addiction, regardless of the dose or length of time on opioids.
- Physical dependence is the occurrence of withdrawal symptoms when the opioid is suddenly stopped or an antagonist such as naloxone (Narcan) is given. Withdrawal symptoms usually are easily suppressed by gradual withdrawal of the opioid.
- Tolerance is a decrease in one or more effects of the opioid (e.g., decreased analgesia, sedation, or respiratory depression). Tolerance to analgesia may be treated with increases in dose. However, disease progression, not tolerance to analgesia, appears to be the reason for most dose escalations. Thus, tolerance to analgesia poses very few clinical problems.

Source: Reprinted from *Pain: Clinical Manual, 2/E,* McCaffery and Pasero, p. 50. © 1999, with permission from Elsevier.

Neuropathic pain typically involves the following:

- Injury to peripheral nerves or central nervous system
- May be described as shooting, stabbing, burning, or shock-like
- May be constant or intermittent
- Less responsive to opioids; responds best to anticonvulsants or tricyclic antidepressants
- Examples: herpes zoster or diabetic neuropathy (Weinreb, Kinzbrunner, & Clark, 2002).

Loss and Grief

The elderly are confronted with a variety of losses in many aspects of their lives, not just with the death of a spouse, family members, or long-time friends. Loss of bodily function occurs as illness becomes more prevalent. Loss of support systems and family and friends occurs as companions die. Loss of independence is a factor as one's physical abilities wane, including loss of mobility, decision making, and access to various other support systems. Not only are the bodily functions lost, but the realization of never regaining these functions is particularly difficult. Primary losses are the loss of people close to them—spouses, children, parents, or siblings. Secondary losses are those resulting from the primary loss—companionship, roles the deceased assumed in the relationship (e.g., bill payer, cook), and independence.

Although the terms *grief* and *mourning* are frequently used interchangeably, each does have a specific meaning. **Grief** is the natural and normal response to loss of any kind and is experienced psychologically, behaviorally, socially, and physi-

Box 22-4
Gone From My Sight: The Dying Experience

Summary of guidelines for impending death

Recognizing that each person approaches death in his or her own way, there are some identified patterns that assist in the recognition of end-stage status, noted in common language for ease of comprehension by patients and families.

One to three months:
- Withdrawal from the world and people
- Decreased food intake
- Increase in sleep
- Going inside of self
- Less communication

One to two weeks:

Mental changes:
- Disorientation
- Agitation
- Talking with the unseen
- Confusion
- Picking at clothes

Physical changes:
- Decreased blood pressure
- Pulse increase or decrease
- Color change (pale, bluish)
- Increased perspiration
- Respiration irregularities
- Congestion
- Sleeping but responding
- Complaints of body being tired and heavy
- Not eating, taking little fluid
- Body temperature hot/cold

Days or hours:
- Intensification of 1 to 2-week signs
- Surge of energy
- Decrease in blood pressure
- Eyes glassy/tearing/half open
- Irregular breathing
- Restlessness or no activity
- Purplish/blotchy knees, feet, hands
- Pulse weak and hard to find
- Decreased urine output
- May wet or stool the bed

Minutes:
- "Fish out of water" breathing
- Cannot be awakened

Source: Summary of Guidelines, pp. 12–23. *Gone From My Sight: The Dying Experience*, Barbara Karnes, RN, P.O. Box 189, Depoe Bay, OR, 97341. Copyright 1986.

cally. It involves many changes over time (Rando, 1993). **Mourning** is the cultural and/or public display of grief through one's behaviors. These include accepting the reality of the loss, reacting to the separation and finding ways to channel the reactions, handling the unfinished business, and transferring the attachment to the deceased from physical presence to symbolic interaction. It seeks to accommodate the loss by integrating its realities into ongoing life (Rando, 1993). Wolfelt (2001) distinguishes mourning as the shared social response to grief—grief gone public.

In this author's experience with hospice bereavement support, the practical application of this information leads to a relatively simple concept that seems logical and is perhaps more easily remembered by people who are mourning: The goal of grieving is not to "get over it" as much of our society encourages, but rather to figure out how to go on living without the loved one actively present in one's life.

Alan Wolfelt (2004) suggests the following mourner's reconciliation needs:

- Acknowledge/accept the reality of the death.
- Embrace the pain of the loss.
- Convert the relationship of the person who died from one of presence to one of memory.
- Develop a new self-identity.
- Search for meaning.
- Receive ongoing support from others.

These present some challenges for the elderly because of the limits they may experience physically and emotionally, and due to chronic or other illnesses. However, it is still important to emphasize reasonable versus unreasonable expectations—grievous loss will produce strong grief, and mourners must be allowed to experience the full dimensions of their unique process.

There are patterns to grief that help describe and show progression in the mourning process, regardless of age. Knowing patterns exist is sometimes comforting, but individualized responses must be acknowledged and affirmed. A reasonable goal is to find a personal balance in each of the aspects of grief patterns—physical aspects such as eating and sleeping and emotional aspects such as tears and stoicism, to name a few—as the mourner attempts to incorporate the loss into his or her daily life patterns.

The mourning process has been characterized by *stages* or *phases*. Although it is tempting to consider it as a neat and tidy progression, the concept of overlapping, retrogressing, and recurring jumbles of feelings and responses is probably more realistic. Phases include the period of numbness occurring at the time of the loss, which provides some emotional protection for a brief time. The period of yearning for the loved one's return tends to deny the permanence of the loss for a time, and may include feelings of anger about a variety of aspects of the loss (including, for example, anger at the medical profession, at the person who died, and/or at God). The phase of disorganization and despair is one of difficulty in functioning in the environment, in which the mourner begins to do the *figuring out* of how to function in each area of disarray. The phase of reorganized behavior is when one pulls life back together, and in which a *new normal* might be identified (Parkes & Bowlby in Worden, 1991).

A brief review of the risk factors for complicated mourning provides special insight into the vulnerabilities of the elderly, especially in light of the secondary losses noted above. According to Rando (1993), there are seven high risk factors in two categories that might predispose a person to complicated mourning.

Factors associated with the specific death:

- Sudden, unexpected (traumatic, violent, random)
- Overly lengthy illness (multidimensional stresses including anger, ambivalence, guilt, problems obtaining health care)
- Loss of a child, including adult children
- Perception of the death as preventable (lack of closure, attempt to regain control, search for reasons and meaning)

Antecedent and subsequent variables:

- Markedly angry/ambivalent/dependent relationship
- Unaccommodated losses/stresses/mental health problems
- Perception of lack of social support

Mourners must be given the opportunity to process the aspects of their grief, but in a context that is helpful to them. Nurses, who are likely to frequently encounter grieving patients, can facilitate the mourning process by being aware of the aspects of grief and mourning, and by advocacy with the people who surround the mourner. Alan Wolfelt (2004) suggests a Mourner's Bill of Rights to help mourners sift out the unacceptable advice they are often given. This includes the right to:

- Experience unique grief, without the pressure of "shoulds/shouldn'ts"
- Talk about grief, or to be silent as needed
- Feel a multitude of emotions, without feeling judgment
- Tolerate physical and emotional limits, and fatigue
- Experience sudden surges of grief
- Use rituals
- Embrace spirituality, or not
- Search for meaning; some questions may not have answers
- Treasure memories; share them
- Move toward grief and heal; avoid people who are intolerant of your grief
- Recognize that "grief is a process, not an event."

Other ways nurses can help include active listening without judging the mourner, having compassion and allowing the expression of feelings without criticizing, allowing the mourner to identify his or her own feelings without saying, "I know how you feel," and offering presence over time (Wolfelt, 2005a).

Frequently, when an elderly person experiences the death of a spouse of long standing, the life expectancy of the remaining spouse may be shortened because of the inability to reconcile the needs of mourning, the complications of grief, and the lack of physical and emotional reserves to make the additional investment into a reconfiguration of one's own future. It is also important to note the potential for difference in mourning styles between men and women, and between various cultural styles.

Box 22-5 Psychosocial and Spiritual Opportunities Near the End of Life

The opportunity to…

Reframe society's view of dying: grow on!
Expand the definition of quality of life.
Focus on the individual, not the disease.
Address as a whole physical pain, psychosocial issues, and spiritual concerns.
Move through fear to peace.
Move through confusion to meaning.
Move through despair to hope.
Move from isolation to community.
Come to terms with the physical body.
Move from loss to closure.
Adjust to new roles.
Get affairs in order.

Source: Kinzbrunner, Weinreb, and Policzer, *20 Common Problems: End-of-Life Care.* 2002. McGraw-Hill Publishers.

Psychosocial, Emotional, and Spiritual Symptoms

Although we frequently attempt to distinguish among psychosocial, emotional, and spiritual issues, the reality is that the range and depth of being human makes it nearly impossible to recognize where one aspect of being ends and another begins. It has been suggested to address these areas as a continuum, and to view the issues that arise in these aspects of our human functioning at end of life as opportunities, rather than as problems (McKinnon & Miller, 2002). "For those caring for the terminally ill, psychosocial and spiritual issues that in the past have been seen as problems can, with information and compassion, become opportunities—opportunities that will allow each of us to live fully until we say goodbye" (McKinnon & Miller, p. 273).

Some issues that arise must be viewed in a practical light, because addressing them might assist in providing resources for the dying elderly to promote quality of life and dignity (**Case Study** 22-3).

PSYCHOSOCIAL ISSUES

When family members are the primary caregivers of the elderly, role changes are very common. Caregivers may resist providing increasing physical care, not wanting to recognize the decline or not wanting to diminish the dignity of the patient. The patient may resist it as well, resenting the need for the increased level of care because it demonstrates yet more limitations and inabilities in level of independence. Caregivers may not comprehend the emotional changes and resistance of their elder, and may become frustrated with the increasing tasks of care and with the emotional burdens of its constancy.

It may be helpful for caregivers to view the last year of a person's life as a reversal of the first year of life. This revised perspective helps the caregiver see that the person is not intentionally increasingly helpless, or necessarily giving up certain functions. Rather, he or she may be losing abilities in a reverse order of that in which infants gain abilities over the first year of life. These may affect the areas of mobility, activities of daily living, cognition, and personal care needs. As physical ability declines, people begin to withdraw from activities, which may further increase dependence on persons around them and their sense of isolation.

Having sufficient physical care—whether from family, paid caregiver resources, or in assisted living or long-term care facilities—is important for those facing end of life. What constitutes sufficient physical care may vary with the individual, but it is always an aspect of end-of-life care that will become more important as the person's physical abilities decline. Although some elderly enjoy this increased dependence, very independent individuals often find this increasing caregiver need to be one of the hardest aspects of treatment to accept.

Many patients and families have financial concerns. The concerns are greater, of course, for individuals or families with few resources, or with only some resources. Although subsidies for some services are available, many people may not have the ability to access them. The palliative care or hospice team may be helpful in linking the patient and family with appropriate financial resources. Nurses may also want to have basic information available for possible referrals when access to other team members is not available. There are agencies and individuals available to augment the family's ability to provide care. Most require private pay resources,

Case Study 22-3

Sometimes, referral to hospice is provided at the very end of life. The patient and family are still able to benefit from the comfort philosophy when the life expectancy is hours or days, rather than weeks. However, the care may often be provided in a crisis-resolving mode, as evidenced in this case study.

Jose is a 76-year-old man who has advanced prostate cancer, metastatic to the lungs. He has been treated with hormone injections for the past 4 years and has had radiation therapy. He has been functioning with the assistance of his wife Maria, has been able to go to lunch with his retired work buddies, and enjoyed sports and the nightly news on TV until about 1 month ago. Upon return home from his most recent hospitalization, Jose continued to have back pain (rated 7 on a 0–10 scale) unrelieved by hydrocodone. He is now increasingly weak, sleeping much of the day and night, and is short of breath with any exertion—even talking. He is disinterested in TV, newspapers, or other outside interests, and is consuming only bites and sips of food and fluids. Jose has voiced concerns about addiction to pain medications. His wife is unable to get him into the physician's office for the scheduled follow-up visit, and calls the physician with concern about managing her husband's care. Maria is crying and seems to be in a panic about how to manage her husband's increasing needs—Jose seems to have a lot of pain, he is incontinent with increasing frequency, and has slipped to the ground with transfers to the bathroom overnight.

The physician calls the home/hospice care agency with an order to evaluate Jose and Maria's situation.

Wishing to evaluate for the possibility of hospice care, the agency sends a nurse and social worker to evaluate the patient's condition and caregiver status. Upon physical assessment, the nurse perceives that the patient's time is short—perhaps hours to a few days, not weeks. The social worker identifies that the wife, age 75, has a history of arthritis and high blood pressure, and will need assistance to provide for Jose's much increased care needs. The couple has no children of their own, and Maria's two adult children live on opposite sides of the country and are unaware of the most recent changes in their stepfather's condition.

Maria appears to be unaware of Jose's end-of-life status. She is talking about building his strength, making his favorite foods so he'll eat more, and arranging for him to attend the army

(continues)

reunion next month that he had so looked forward to.

Questions:

1. What are your recommendations after the initial assessment?
2. How can you begin to alleviate Maria's apparent denial about Jose's condition?
3. What team members should be a part of Jose's care plan?
4. How can we determine Jose's goals for his end of life?
5. Evaluate Jose's emotional status; how does it affect his daily functioning? How does it affect his relationship with his wife? How can other team members assist with these issues?
6. What impact do Jose's spiritual life/beliefs have on his condition and functional ability?
7. How might hospice offer Maria assistance in meeting Jose's physical care needs?
8. What can be done for Jose's symptoms? How would you address Jose's addiction concerns, in light of the fact you believe he needs a stronger opioid?
9. What support will Maria need in keeping Jose at home?
10. What other care options exist to provide Jose and Maria with hospice care—but not in their home?

Suggested Actions/Responses

- The nurse and social worker need to address Jose's poor condition, and the reality that he will not likely be here next month in order to help Jose and Maria understand the gravity of his condition, and the probable brevity of his life expectancy.

To alleviate Maria's apparent denial, they begin by asking Maria about the last hospitalization—what the doctors told them about Jose's condition and what to expect in the future. Maria reports that the doctors didn't really say anything different than before: Jose is to see the doctor in the office tomorrow, maybe he can have another round of radiation treatments, if he can build up his strength in the next few weeks.

- The nurse and social worker then talk with Maria about her observation of the changes she has noticed in Jose's condition over the past few weeks.

Maria has noted the increased physical weakness, falls, very poor appetite, and increased sleep since his return home from the hospital. Jose awakens for part of this conversation, and states that he thinks his time is short. "I know I'm weaker. It's just hard for her to

accept." Jose also says he "does not want to go back to the hospital. It's so noisy there, and it's too hard for Maria to get back and forth to visit there, and I don't think they can help me anymore." Maria is tearful, chiding Jose about giving up. Jose is obviously tired, but accepts a brief explanation of hospice philosophy and services. He indicates that "It's OK with me, but I will do whatever Maria wants. She's the one who needs to iron out the details." He dozes off shortly after making these comments.

Maria feels more free to talk, and speaks of Jose's independence, and her promise to keep him at home. "He has always taken care of me, and now I want to do that for him." The social worker provides her with printed information about patterns of condition and actions at end of life, and gently and honestly discusses the implications of the various observations Maria has made about Jose's condition. Maria begins to see that, according to her own observations, Jose really is nearing his dying process.

- Because the nurse believes the patient meets the hospice admission criteria with a prognosis of 6 months or less, and because she and the social worker perceive the apparent crisis situation with Jose and his wife, she notifies the physician that the patient is unable to meet the appointment tomorrow and requests an order for hospice admission that same day. Receiving it, she requests the appropriate medications for comfort, including a short-acting opiate for shortness of breath and pain, and an antianxiety agent to assist with the anxiety accompanying Jose's shortness of breath.

Maria indicates they would accept the services of hospice. Services are explained to her, including the support she is now receiving from the nurse and social worker, an HHA for Jose's personal care, the medical equipment to make care easier, as well as education about other team roles.

In discussing their support system, Maria indicates a strong relationship with their church and priest. The church has a parish nursing program, and one of the nurses has a committee of people willing to help those who are struggling with illness. Maria agrees that now is the time for this support from their church. She places a call to the priest, outlining their current situation and plans for hospice admission today. She also requests a home visit by the priest for confession, communion, and anointing of the sick for Jose.

Maria calls her children to let them know of Jose's decline; her son will come for a long weekend arriving "in a day or two." Her son-in-law is out of town on business, and her daughter will try to contact him about the changes, so she can come as well.

(continues)

This hospice has a local inpatient center in their community, but Maria is adamant at this point in keeping Jose at home, if that is what he wants. Jose would medically qualify for the inpatient care due to his uncontrolled symptoms and probable brief prognosis.

- To allay Jose's fears of addiction, the nurse explains the difference between physical and psychological need for medication. She points out that his need is for physical relief, not for a psychological high. She explains that "if you were diabetic, you would take insulin. If you had high blood pressure, you would take medication for that. You have pain, so you need medication to control your pain. This is not a psychological addiction, but it is to meet a physical need in your body. We could start with a small dose, to see how that affects you, and can increase the doses a little bit at a time, until you are more comfortable."
- The social worker, in the meantime, with Maria and Jose's permission, arranges for the delivery of a hospice-provided hospital bed for placement in their living room, near the hub of activity in the house, and close to the bathroom, kitchen, and his favorite recliner chair. The social worker also provides Maria with the nonemergency number for the fire department to assist in picking up the patient if he slides to the floor again. The on-call availability of hospice team members and parameters for their use is explained to Maria, with the number to call prominently posted on her refrigerator. A hospice volunteer is referred to allow Maria time to take a nap or to obtain a few groceries. Maria asks if she can use the hospice volunteer to keep Jose company while she visits the funeral home to make sure their arrangements are in place. An HHA is scheduled for tomorrow morning to provide a bed, bath, shave, and hair-washing for Jose.

When Maria has calmed, the church friend has arrived, the DME is on the way, and delivery of the medications is in process, the nurse and social worker review contact information, instructions, and plans for the nurse's visit the following day. Maria is again tearful, but this time with gratitude for the help and organization she has received. Maria and Jose (who is again asleep) have come a long way in their adjustments in a short period of time. Maria says wistfully, "I wish the doctor had been as clear as you were in talking to me about what to expect. Jose and I could have been getting ready for this for awhile now."

Jose died comfortably a few days later, with Maria and her son at his side.

but some are government sponsored in order to keep people in their homes a bit longer (e.g., some Medicaid-sponsored hours that provide in-home support are available in some states for those individuals who financially qualify).

Emotional Issues

A person's place in the life cycle affects their reaction to end-of-life circumstances. As an elderly person faces death, the individual looks back upon life and reflects upon its experiences. There is an attempt to emotionally integrate all the aspects of one's life, including determination of its meaning and acceptance of its uniqueness (Rando, 1984). It is an unfair exaggeration to imply that the elderly are all at peace with their coming death. Some are and some are not. The elderly do appear to see death as an important issue, one they often think about and plan for. "One of the most surprising lessons our teachers (the dying) offer is that life doesn't end with the diagnosis of a life-challenging illness—that's when it truly begins . . . because when you acknowledge the reality of your death, you also have to acknowledge the reality of your life . . . that you have to live your life now. . . . The primary lesson the dying teach us is to live every day to its fullest" (Kubler-Ross & Kessler, 2000). Caring intervention should continue to facilitate an appropriate death for the aged individual.

Anticipatory grief is a process of adjustment during the course of the terminal illness that is faced by the patient as well as by the family/caregivers. It usually begins at the time of diagnosis, and can be caused by a variety of adjustments and secondary losses experienced by and required of the individual (**Box 22-6**). These might include loss of control, independence, productivity, security, various abilities, predictability and consistency, future existence, pleasure, ability to complete plans and projects, significant others, meaning, dreams, and **hopes** for the future (Rando, 1984).

Persons who are facing end of life often encounter feelings of hopelessness. They may find comfort and be helped to adjust to their changing condition by recognizing a changing focus of hope. "A patient can hear a terminal diagnosis and still have hopes for the type of life remaining" (Rando, 1984, p. 270). When a person is confronted with the possibility of a life-ending illness, usually the first response is: "I hope it's nothing serious or that it can be easily treated without much disruption in my life." As treatment is not successful and as the illness progresses, one might hope that "my family and I will have the opportunity to get things done . . . have closure . . . see the granddaughter get married."

When getting better or prolonging life is not feasible, one is often confronted with giving up hope altogether. That is how some people feel when they choose hospice or palliative care. That is, in fact, what some physicians imply when they say, "There is nothing more that can be done for you." Hospice and palliative care personnel believe that hope can continue—but the focus of hope changes from that of getting better. One can hope for the appropriate help and support for themselves and their families through the transitions that end of life brings. They can hope that they will be provided with guidance and emotional comfort, and that their care will be provided with respect for their dignity through the dying process. They can hope that their passing will be comfortable and pain free. They can hope that their families will receive the appropriate support before and after their death. They can hope to be treated holistically—as an individual with unique needs, wishes, and desires.

Four powerful statements proposed by Ira Byock provide a clear path to emotional wellness

Box 22-6 There's An Elephant in The Room

By Terry Kettering

There's an elephant in the room.
It is large and squatting, so it's hard to get around it.
Yet we squeeze by with, "How are you?" and, "I'm fine . . ."
And a thousand other forms of trivial chatter.

We talk about the weather,
We talk about work.
We talk about everything else . . .
Except the "elephant" in the room.

There's an elephant in the room.
We all know it is there,
We are thinking about the elephant
As we talk together.

It is constantly on our minds.
For, you see, it is a very big elephant.
It has hurt us all, but we do not talk about
The elephant in the room.

Oh, please, say her name.
Oh, please, say, "Barbara" again.
Oh, please, let's talk about
The elephant in the room.

For if we talk about her death,
Perhaps we can talk about her life.
Can I say, "Barbara" to you
And not have you look away?

For if I cannot,
Then you are leaving me alone—
In a room—
With an elephant!

Source: Reprinted with permission of Bereavement Publishing, Inc., (888) 604-4673, 4765 Carefree Circle, Colorado Springs, CO 80917.

throughout a lifetime. They also provide a format for resolving some personal, emotional, and/or spiritual issues at end of life. They are:

"Please forgive me. . . . I forgive you. . . . Thank you. . . . I love you" (Byock, 2004, p. 3).

Spiritual Issues

Spiritual issues may or may not be related to the person's relationship to or lack of affiliation with an organized religion. Some may find great peace and comfort in a religion and its practices and rituals. Others are just as spiritual, without the link to religious ties and practices, perhaps finding comfort in nature or some other source.

Spiritual and cultural rituals may be important for some people at end of life. Nurses may be in a position to help patients and families to obtain access to the rituals that may be important as a person is nearing death (**Box 22-7**). For some religions, this may mean obtaining appropriate clergy for confession, communion, and anointing. For others it may mean a more general ritual for commendation of the dying. For some cultures, certain foods, fasting, handling of the body, and placement in a certain position to facilitate burial may be important (Kirkwood,

Box 22-7 Suggested Resources

Albom, M. (1997). *Tuesdays with Morrie: An old man, a young man, and life's greatest lesson*. New York: Doubleday.

Association for Death Education and Counseling (ADEC), promoting excellence in death education, bereavement counseling, and care of the dying. Available at www.adec.org.

Callanan, M., & Kelley, P. (1992). *Final gifts: Understanding the special awareness, needs and communications of the dying*. New York: Poseidon Press.

Ferrell, B. R., & Coyle, N. (2001). *Textbook of palliative care nursing.* New York: Oxford University Press.

Hospice Foundation of America. Available at www.hospicefoundation.org.

Last Acts Campaign (to improve care at end of life). Available at www.lastacts.org.

Matzo, M. L., & Sherman, D. W. (2001). *Palliative care nursing: Quality care to the end of life.* New York: Springer.

National Hospice and Palliative Care. Available at www.nhpco.org.

Nuland, S. B. (1993). *How we die: Reflections on life's final chapter*. New York: Random House.

Project on Death in America. Open Society Institute. Available at www.soros.org/death/index.html.

Smith, W. J. (2000). *The culture of death: The assault on medical ethics in America*. San Francisco: Encounter Books.

Webb, M. (1997). *The good death: The new American search to reshape the end-of-life.* New York: Bantam Books.

Wit. (2001). A movie made for HBO and a Pulitzer prize-winning play by Margaret Edson featuring a single-minded English professor, who in the face of imminent death learns the power and importance of simple acts of human kindness. Available for purchase at www.hbo.com/films/archive/w.shtml.

1993). As in other aspects of individualized care, it is appropriate to simply ask the patient and/or family about these preferences.

To formalize this asking, several brief assessments have been developed for use by nurses to incorporate a spiritual component into their nursing plan of care. These are available for detailed review in *Spiritual Care in Nursing Practice* (Mauk & Schmidt, 2004). The assessments are easy to incorporate, using acronyms as reminders in obtaining the spiritual history content. The information obtained by the nurse may be useful for interventions with the patient and family by other members of the care team, regardless of the setting in which care is provided.

Components of Peaceful Dying

It may be possible to plan for a peaceful death, given the knowledge of having a terminal illness. "The key to peaceful dying is achieving the components of peaceful living during the time you have left" (Preston, 2000, p. 161). Some components are accomplished only by the

Box 22-8 HOPE Model

H = Sources of hope, meaning, comfort, strength, peace, love and connection: What do you hold on to during difficult times?
O = Organized religion: Importance? Helpful and nonhelpful aspects?
P = Personal spirituality and practice: Relationship with God? Most helpful aspects of spiritual practices?
E = Effects on medical care and end-of-life issues: Has illness affected your ability to do the things that usually help you spiritually? Are there specific practices to be aware of in providing care? Can I help access resources helpful to you?

Source: Reproduced with permission from Spirituality and medical practice: Using the HOPE questions as a practical tool for spiritual assessment. January 1, 2001, *American Family Physician.*

Box 22-9 SPIRIT Model

S = Spiritual belief system (formal affiliation)
P = Personal spirituality (beliefs, practices, personal meaning)
I = Integration and involvement in a spiritual community
R = Ritualized practices and restrictions (encouraged or forbidden)
I = Implications for medical care (to include, or as barriers)
T = Terminal events planning (decision making, advance directives)

Source: Maugans, T. A. (1996). The SPIRITual History. *Archives of Family Medicine, 5*(1), 11–16.

Box 22-10 FICA Model

F = Faith or beliefs (What gives meaning to life?)
I = Importance and influence (Is faith important? How do beliefs influence behavior toward illness?)
C = Community (Is the spiritual or religious community supportive? How? Person or people important to you? People you love?)
A = Address (How would you like health care providers to address these issues in your health care?)

Source: Puchalski, C. & Romer, A. L. (2000). Taking a spiritual history allows clinicians to understand patients more fully. *Journal of Palliative Medicine, 3*(1), 129–131.

individual, whereas others may require the assistance of family and medical providers, such as the following (Preston, 2000):

- Instilling good memories
- Uniting with family and medical staff
- Avoiding suffering, with relief of pain and other symptoms
- Maintaining alertness, control, privacy, dignity, and support
- Becoming spiritually ready
- Saying good-bye
- Dying quietly

Conclusion

When death approaches for the elderly patient, the role of the nurse changes along with the patient's changing condition. The role moves from a fix-it focus to that of presence—the ability to be with the patient and with his or her family. This presence involves the provision of comfort measures, lending a listening ear, providing a peaceful environment, and compassionately educating patient and family about the dying process. The nurse's gratification does not come from curing, but rather from supporting the patient in a peaceful and dignified death.

> *"You matter because you are.*
> *You matter to the last moment of your life,*
> *and we will do all we can*
> *not only to help you die peacefully,*
> *but to live until you die."*
> — Cicely Saunders (1984, p. 33).

Glossary

Addiction: Compulsive psychological dependence on and use of a habit-forming substance, characterized by continued craving and well-defined physiological symptoms upon withdrawal; not considered to be an issue when using opioids for end-of-life and palliative care.

Advance directives: Spoken and written instructions about future medical care and treatment; legal documents outlining a person's wishes for future medical treatments to be (or not to be) provided at some time in the future, at a time when the individual is not able to verbalize or make his or her wishes known. These include a living will, durable power of attorney for health care, and life-prolonging procedures documents; they are only in effect if the individual is unable to make his or her wishes known.

Analgesic ladder: World Health Organization suggestions for implementing increasing strengths/types of pain medications based on increasing symptoms.

Allow Natural Death (AND): Used as an advance directive in some locations instead of a DNR (do not resuscitate) order; promotes a more positive approach to consideration of a person's wishes at end of life.

Communicating bad news: Module 2 of *Education in Palliative and End-of-Life Care* (EPEC) training for medical personnel, to promote honest and compassionate discussion about end-of-life care and options for treating life-ending illnesses.

Complementary therapies: Interventions used in collaboration with conventional health care interventions that promote comfort or healing.

Curative care: Medical care focused on healing/cure of disease.

Do Not Resuscitate (DNR): A physician's written order instructing health care providers not to attempt cardiopulmonary resuscitation (CPR) in case of cardiac or respiratory arrest.

Dependence: Physical response to use of opioids, characterized by withdrawal symptoms when the opioid is stopped.

End of life: Last stages of living; in this context usually caused by a terminal illness.

Five Wishes: An alternative advance directive that gives additional information and explanation about a person's wishes for end-of-life care; not legally recognized in all states.

Grief: A natural and normal reaction to a loss of any kind.

Hope: To expect with confidence.

Hospice care: A program to deliver palliative care to individuals in the final stages of a terminal illness; additionally provides personal support and care to the patient, and supports to the patient's family/caregivers while the patient is dying; provides bereavement support after the patient's death.

Interdisciplinary team/group: Professional staff and volunteers who focus on physical, emotional, psychological, social, and spiritual aspects of a person

in designing and/or implementing holistic care; common in hospice and palliative care and other care settings.

Mourning: The outward demonstration of a person's grief responses to a loss.

Pain scales: Measurement options by which medical personnel can translate a person's self-assessment of pain for appropriate intervention decisions.

Palliative care: Concept of care designed to promote comfort and holistic management of symptoms at any stage of illness or disease.

SUPPORT study: The Study to Understand Prognosis and Preferences for Outcomes and Risks of Treatment; it revealed deficiencies in care and treatment of the terminally ill in U.S. medical practices.

Symptom management: Focus on promotion of comfort and alleviation of a variety of symptoms.

Tolerance: Decrease in one or more effects of an opioid, usually due to disease progression; may be treated with increased doses with few clinical problems in the terminally ill.

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Chapter 23

Future Trends in Gerontological Nursing

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LEARNING OBJECTIVES

At the end of this chapter, the reader will be able to:

1. Identify current career trends in gerontological nursing.
2. Describe several settings and positions in which gerontological nurses may be employed.
3. Define financial gerontology.
4. Distinguish among the certification requirements for chartered Advisor for Senior Living, Registered Financial Gerontologist, Certified Senior Advisor, and Certified Life Care Planner.
5. Recognize the benefits of life care planning for the elderly with catastrophic injury or chronic illness.
6. Discuss the concept of long-term care insurance.
7. Recognize legal and ethical issues related to long-term care insurance.

KEY TERMS

- Advanced practice nurses
- Certified Life Care Planner (CLCP)
- Certified Senior Advisor (CSA)
- Chartered Advisor for Senior Living (CASL)
- Financial gerontology
- Life care plan
- Long-term care insurance
- Registered Financial Gerontologist (RFG)

Dozens of career options exist in the field of gerontological nursing. In addition to various job descriptions, gerontological nurses work in a variety of settings, from the community with well elderly to hospice with the dying, and every point in between along the continuum of care. A few unique possibilities in gerontological nursing will be discussed later in this chapter.

Educational and Career Trends in Gerontological Nursing

Opportunities in gerontological nursing are somewhat correlated with education level. The common settings for gerontological nursing practice were discussed in Chapter 1. Many levels of preparation are available for nurses in gerontology. First, as has been noted throughout this text, all nurses should receive special education in caring for older adults during their basic nursing preparation, whether at the LPN; RN associate degree; diploma RN; or RN, BSN level. Postbaccalaureate nurses may choose a clinical nurse specialist (CNS) in gerontology or geriatric nurse practitioner (GNP) program. In addition, some programs offer a postmaster's GNP certificate. There are four certifications in gerontology available from the American Association of Colleges of Nursing (AACN). These are discussed in Chapter 1.

Most gerontological nurses with basic preparation find work in long-term care facilities such as nursing homes, assisted living, independent living centers, adult day care, or in an acute care hospital. Nurses who obtain a BSN and continue to work in geriatrics often become unit managers, then assistant directors or directors of nursing in nursing homes or other long-term care settings. Many geriatric nurses work in home health care and hospice, those specialities that service many chronically ill and/or dying older adults.

For **advanced practice nurses**, opportunities for further career development are many, but often depend upon one's geographic location. Certainly larger teaching hospitals in big cities have many more positions for gerontological clinical nurse specialists and GNPs than smaller towns. Positions in education through county hospitals or religiously affiliated health care systems are generally available, though many CNSs and NPs have been known to carve their own niche, write their own job description, and literally "make a job for themselves" by marketing their expertise in an area of need. Indeed there may be significant overlap in some clinical specialty areas that tend to serve a large elderly population, such as oncology or wound/ostomy nursing, creating even more job possibilities. One thing is certain, the advance practice nurses of today and the future will need to be more business minded to obtain their ideal desired position.

For nurses with doctoral-level education, careers as faculty members abound. The faculty shortage is acute and projected to continue. There is a tremendous need for certified and well-prepared faculty members in gerontological nursing to teach students who will care for the aging population. Nurses may obtain several doctorates that may be considered terminal degrees, though this varies with each university and school of nursing. The PhD (doctor of philosophy in nursing) and DNS (doctor of nursing science) are currently recognized as terminal nursing degrees by most universities. The PhD is a universal research degree recognized in most countries. This preparation allows the holder to design and conduct research in addition to tak-

ing coursework in theory, statistics, and philosophy. The DNP (doctor of nursing practice) is a clinical doctorate that is gaining more popularity in combination with obtaining certification as a nurse practitioner. It is not intended to prepare the nurse to be a researcher. Some nursing faculty members hold an EdD, an educational doctorate, with coursework emphasizing curricular development and teaching. Most doctorally prepared gerontological nurses work in academic or research institutions, as authors, speakers, consultants, or private business owners. Those with the ND designation are found more often in collaborative practice with physicians in primary care settings, though some gerontological nurses have branched into rehabilitation and outpatient clinics that deal with older adults.

In addition to all of the educational opportunities in nursing, many colleges and universities offer majors, minors, certificates, or concentrations in gerontology that can be taken in addition to or even along with the nursing major. According to the Association in Gerontology for Higher Education (AGHE), "there are over 500 colleges and universities that offer more than 1,000 credit programs in aging" (2005) in some formal programs, and over 1,000 additional schools offer some type of coursework in aging (AGHE). For nurses wishing to specialize in gerontology from the beginning of their career, additional coursework in the field is recommended.

Potential Opportunities in Gerontological Nursing

The opportunities for nurses in geriatrics cover a wide variety of educational levels and settings for employment. All nurses working in acute care will care for older adults at some time, and it is estimated that about 50% of patients in hospitals are currently over 65 years of age. This fact is being recognized by nursing programs throughout the world. Evidence of this is provided through grants funded by the John A. Hartford Foundation to increase gerontological content in the nursing curriculum. The Hartford Foundation has provided millions of dollars in funding to promote education in both nursing and social work, particularly to prepare these health care professionals to give quality care to older adults. The AACN in cooperation with the Hartford Foundation gives annual awards to programs and individuals for their work in gerontological nursing.

Although many nurses will find their first jobs in acute care hospitals, nurses historically change positions throughout their careers. With the projected changes in the population distribution to a large older cohort of baby boomers, nurses are likely to see a dramatic shift in the types and numbers of nonhospital opportunities for career advancement.

The need for clinical nurse specialists in gerontology is likely to increase, as is the need for geriatric nurse practitioners. Because the baby boomer generation is known to be an autonomous, well-educated, informed consumer group, this population cohort is more likely to demand a higher level of education and expertise among care providers. As health-conscious and savvy researchers, baby boomers will want the highest quality care from those with the most expertise (and for the best value for their money). These trends point to advanced practice nurses as the most valuable professionals of the upcoming older generation.

Over the next decades, the health care system may experience unexpected shifts, such as more care being provided in the home by spouses and family members. Nurses may be called upon to

train family members to care for loved ones in their home to a much greater extent than occurs today. On the other hand, though baby boomers may not wish to be cared for in institutions or long-term care facilities, their children are a generation that tends to be quite mobile and more focused on meeting their own life goals than perhaps taking care of elderly parents. If life expectancy continues at its current rate or even increases, baby boomers may be assisted in later life more often by their spouses, friends, church communities, and with assistive technology than ever before. The demand for better, higher quality, more personal and professional care in nursing homes may also increase if aging baby boomers can no longer be cared for in the home environment.

Indeed, there is a trend today for large churches or even groups of churches to come together to build and maintain their own retirement facilities with care ranging from independent living to assisted living, intermediate, skilled, Alzheimer's units, and rehabilitation. Nurses with faith-based backgrounds may find such new ventures challenging as they assist with development during the planning phase before even the first brick is laid. Certainly no such facilities would be possible without nurses, so such interesting ventures funded largely by donations and gifts from church members to care for their own elderly members present exciting possibilities for new nursing positions in both staff and management. Facilities such as these are often more open to the enterprising nurse who approaches them with his or her ideas for a new job position, such as a wellness coordinator or clinical nurse specialist to educate staff and focus on maintaining function and independence for older residents.

All these potential changes lead to the possibility that gerontological nurses of the future will need to be more highly educated and have a good business sense, excellent management skills, and greater flexibility in the workplace (**Case Study 23-1**). Nurses may be seen more often in collaborative practice to meet the growing needs of greater numbers of older adults. Advanced practice nurses will become more entrepreneurial, creating companies that specialize in educating businesses, churches, organizations, and private health care consumers about the aging process and how to stay healthy longer. Nurses will collaborate on a new level with other disciplines such as financial planners (financial geronotology) (Mauk & Mauk, 2006) and church leaders (parish nursing) to meet the various needs of the upcoming older health care consumer. All of these changes make gerontological nursing an exciting field to be in today! In this chapter, several emerging trends within other disciplines will be discussed in light of how the roles of nurses in gerontology are changing and expanding (**Case Study 23-2**).

Life Care Planning

The concept of life care planning was first developed in the 1980s to meet a growing need for an informed document that presented actual estimated costs of care for persons who had experienced a catastrophic injury or accident. Many settlements for those persons in devastating accidents were made arbitrarily without actual calculation and consideration of the multitudes of factors influencing these costs, such as doctor's visits, equipment, medications, tests, cost of caregiving, and potential complications over a lifetime.

Definition

A **life care plan** is a comprehensive document designed to help meet the long-term financial and health needs of a person who has experi-

Case Study 23-1

Norma is a 66-year-old married woman whose 87-year-old father has been recently diagnosed with early stage Alzheimer's disease (AD). With her father's progressive forgetfulness, Norma wishes to have him in a more supervised environment than she can provide, yet one in which he can still maintain his independence for as long as possible. A nearby long-term care facility offered an early AD unit, but Norma is concerned about exhausting her father's financial resources to pay for his care over what could be a long period of time.

Questions:

1. To what type of professional(s) could Norma go to for assistance with her concerns?
2. What role would a nurse consultant play in this situation?
3. Could a financial gerontologist be of assistance, or would a financial planner with a CASL designation be more likely to provide the information Norma needs?
4. Which of the professionals discussed in this chapter would you refer Norma to first?
5. What types of costs could she expect to incur for these types of services?

enced a catastrophic injury. For example, a person suffering paralysis from a complete spinal cord injury as a result of a car accident may have a lawyer who uses the services of a life care planner to determine as closely as possible the care needs of the person over many years of living with a disability. Armed with this information in court, and able to use the testimony of a life care planner, lawyers are more likely to obtain an equitable, reasonable, and necessary settlement for their clients.

Life care planners generally develop plans for insurance companies or lawyers representing individual clients, but the ultimate goal is to promote the best outcome for the person for whom the life care plan was written (**Case Study 23-3**). The best life care planners have a nearly equal mix between work for insurance carriers and work for lawyers who present patients, thus maintaining a neutral and professional reputation for fairness. It is common for there to be much give and take in the discussion of arriving at a fair monetary settlement for the patient who has been the victim of a catastrophic accident. Life care planners research, analyze, compile, and present the facts in a comprehensive, balanced document that details all of the expenses that a person with catastrophic injury may incur

Case Study 23-2

Terry is a nursing student who is finishing his BSN in an accelerated program. He has a previous degree in sports management and thinks he would like to combine a gerontological nursing focus with his prior experience and education. Terry enjoyed working with older adults in the community during his clinical experiences, and he has even thought about going on for further education as an advanced practice nurse with an emphasis in gerontology.

Questions:

1. Given Terry's first degree, what options should he consider for his first job out of the nursing program?
2. How could Terry combine his prior knowledge in sports management with his love of gerontology and his nursing knowledge?
3. What types of jobs might he apply for?
4. If Terry decided to go into business for himself, what marketable services could he offer? Who would be his target audience?
5. If Terry did go on for a master's degree, what types of programs should he look into to meet his long-term goals?
6. What types of advanced practice nursing program might offer Terry greater opportunities to use his background in sports management as well as his desire to work in gerontology?

over his or her expected lifetime. Software programs are available that help manage the data obtained from various sources, including physicians, pharmacists, nurses, the patient, family, and other team members.

Certification

The designation of **Certified Life Care Planner (CLCP)** may be earned through 128 continuing education hours, successful completion of a sample life care plan, and passing an examination (MediPro Seminars, 2004). **Table 23-1** gives an example of some of the topics for life care planning certification.

The CNLCP (Certified Nurse Life Care Planner) designation is offered by the American Association of Nurse Life Care Planners Certification Board (AANLCPCB). It is similar to the CLP, but with additional requirements, and is definitely designed for registered nurses with case management experience (Professional Testing Corporation, 2004). The strict prerequisites and large number of practice hours make this a more difficult credential to obtain than the CLCP. This

Case Study 23-3

Mr. Lopez is an active 72-year-old male who recently sustained a complete C4 spinal cord injury as a result of a motorcycle accident. Mr. Lopez and his family are seeking damages from the insurance company of the person in the vehicle who hit Mr. Lopez while he was riding his motorcycle. Mr. Lopez exhibits quadriplegia and is expected to need a great deal of care and rehabilitation. His rehabilitation nurse suggests the services of a life care planner to assist Mr. Lopez and his attorney in devising a plan to cover his expected costs over the rest of his lifetime.

Questions:

1. Is the use of a life care planner a good suggestion in the case of Mr. Lopez?
2. How might the expertise of a life care planner help Mr. Lopez in the long run?
3. What types of information would a life care planner ask for?
4. What information does the life care planner provide to the attorney, courts, and insurance companies?

certification demonstrates that the life care planner is a seasoned registered nurse. Conversely, the CLCP designation may be earned by any variety of professionals or nonprofessionals, including financial planners and lay persons who meet the criteria. To recertify in either of these certifications requires a certain number of continuing education hours as well as practice hours and renewal fees within a certain number of years, as with most such designations.

Future Potential

Life care planning may be a concept that will be carried into the senior population. Not only are seniors living longer, but they continue in higher risk activities today than in generations past. The rate of catastrophic accidents formerly considered to be prevalent among younger adults may now be seen with older adults in activities such as motorcycle riding, horseback riding, skiing, and continuing to operate automobiles and other machinery well into late life. This also places older adults at risk of requiring the services of a life care planner at some time in their life.

Although originally designed for those with catastrophic illness or accident, the principles of life care planning could also easily be extrapolated for use with those seniors who have long-term chronic health problems. Although a good financial planner could provide a comprehensive financial life plan that takes health status into account, a life care planner could provide a more accurate and detailed projection of health care costs over a lifetime of disability or illness.

Table 23-1 Examples of Topic Areas for the Life Care Planning Examinations

- Life care planning principles
- Case management principles
- Medical interventions and complications associated with medical conditions:
  Traumatic brain injury, spinal cord injury, burns, amputations, common pediatric and neonatal disabilities, chronic pain, AIDS, cancer, orthopedic injuries, other complex disabilities, vocational tools
- Interdisciplinary team
- Legal/ethical issues
- Legislation
- Measurement and statistics
- Psychological issues
- Life care planning charts

As the population ages, so does the incidence of chronic illnesses and disease. The demand for professionals in gerontology and rehabilitation is likely to grow quickly with the aging baby boomer group. Gerontological nurses are in a unique position to combine their knowledge in health care with some financial training to offer distinctive services to the older age group. A life care plan allows individuals to prepare for the likely impact of their health condition over their lifespan and to plan accordingly. "In the areas of finance, economics, and marketing, new trends are being seen that combine the expertise of financial planners with health care advisors and advocates for seniors" (Mauk & Mauk, 2006, p. 2). The baby boomer generation, as has been noted, is made up of conscious and conscientious health consumers who are informed, educated, thrifty, and autonomous. The life care planning market may be an area for exponential growth in the next decades.

Financial Gerontology

Financial gerontology is a growing subfield of financial planning. Financial gerontology is defined as "the intellectual intersection of two fields, gerontology and finance, each of which has practitioner and academic components" (Cutler, 2004, p. 29). Mauk and Mauk (2006) stated "financial gerontology combines the knowledge and skills associated with financial planning and asset management with expertise in meeting the unique needs of older adults" (p. 4). This emerging market presents excellent opportunities for gerontological nurses who also have an interest in finances and health care decision making. Three certifications will be discussed here: **Chartered Advisor for Senior Living (CASL)**, **Registered Financial Gerontologist (RFG)**, and **Certified Senior Advisor (CSA)**. Many graduate nursing programs are now offering dual degrees of Master in Business Administration (MBA) and Master of Science in Nursing (MSN). These educational trends support the idea that there is a growing need for health care professionals such as nurses to be educated beyond traditional health-related science.

Chartered Advisor for Senior Living (CASL)

The CASL (a designation obtainable from The American College) "is a financial service professional who is uniquely qualified to work with mature clients and those planning for retirement" (The American College, 2005, p. 2). A person with a CASL certification assists older

persons with retirement savings, pension and social security planning, health and long-term care issues, estate planning, and "managing life course transitions, family relationship and living arrangements" (The American College, p. 3). This designation is appropriate for persons who work with older adults, including financial planners, case managers, accountants, attorneys, long-term care specialists, and nurses (**Case Study 23-4**). Gerontological nurses, both at the basic preparation level and those in advanced practice, already have some basis of expertise through education and experience that would make obtaining this certification more meaningful. Although the content on aging would be familiar to most nurses, the financial aspect of the certification is challenging if one does not have an accounting or business background.

To earn the CASL designation, a person must successfully complete five courses that take approximately 60–80 hours of study each. After each course, the individual must pass a computerized exam. Maintenance of the certification is comparable to most nursing certifications,

Case Study 23-4

George is a 56-year-old male preparing to retire from a career in private business. He notices that many of his friends, some much older than he, have made little or no plans for financial security after retirement. These friends often come to George for advice on finances, but he feels ill-prepared to give them an opinion on things related to the senior market and the possibilities for investments and retirement planning. After his retirement, George thinks he would like to have a small home business to advise seniors on financial matters, but he feels he would need additional training and does not wish to spend a lot of time or money "tinkering" with this business after retirement.

Questions:

1. Given George's situation, what options are available to him to increase his knowledge about financial advising for older adults?
2. What might be the best program to fit George's needs and goals?
3. Which programs are most costly?
4. Which programs require the most investment of George's time?
5. Does George even need a special credential to start his small business?
6. What are the benefits and disadvantages of George obtaining a designation or certification in one of the areas discussed in this chapter?

with continuing education credits required. A code of ethics must also be agreed to in writing prior to being granted the designation.

Registered Financial Gerontologist (RFG)

The Registered Financial Gerontologist (RFG) certification is a similar designation to the CASL, but is offered through The American Institute of Financial Gerontology and supported by the American Society on Aging (American Institute of Financial Gerontology, 2004). To earn this certification, individuals must complete six courses, a learning requirement, and a comprehensive examination. Course content is related to wealth span planning, ethics, and serving the older client. Compared to the CASL courses, the curriculum appears more suited to gerontologists than financial planners. This should be kept in mind when choosing the most appropriate designation for a nurse's career planning.

Certified Senior Advisor (CSA)

The Certified Senior Advisor (CSA) is a designation offered by the Society of Senior Advisors. There are currently 17,000 persons in the United States with this certification. The curriculum includes a large number of topics in aging, chronic illness, end-of-life, and long-term care as well as Medicaid and financial planning (Society of Certified Senior Advisors, 2005). It is a self-study program that takes 2–6 months to complete. To obtain the CSA, the person must also pass a secured, computerized, final comprehensive examination online that consists of 150 multiple choice questions within 3 hours (Society of Certified Senior Advisors).

Long-Term Care

Each of the certifications discussed in this chapter prepare persons to help the elderly with long-term care needs. Long-term care is "the broad range of medical, custodial, social, and other care services that assist people who have an impaired ability to live independently for an extended period" (Beam & O'Hare, 2003, p. 3). The National Council on Aging (2005) estimates that 6.4 million people over the age of 65 and 50% of those over age 85 will need long-term care. Thirteen million persons in the United States currently report having long-term health care needs. This number is expected to grow to 22 million in the next two decades (Chiappelli, Koepke, & Cherry, 2005). Persons must pay for many long-term care expenses from their savings and assets, or spend down their financial assets before being eligible for Medicaid. This has prompted new sources of funding for future long-term health care needs.

Long-Term Care Insurance

Long-term care insurance is designed to cover individuals needing health care outside of the hospital, including diagnostics testing, rehabilitation, and custodial care. Reasons for purchasing long-term care insurance include worrying about being a burden to their family, staying financially independent, having more choices for care if needed (such as remaining in the home), preserving their assets, and providing peace of mind (United Seniors Health Council, 2005) (**Case Study 23-5**).

The cost of long-term care insurance premiums (at age 65) ranges from $1,000–$2,650 per year, depending upon a number of factors including health status and history. The average

Case Study 23-5

A nurse has a grandmother who was recently diagnosed with diabetes. Until now, she has been relatively healthy. Her grandmother has been looking into long-term care insurance because she is afraid that either she or her husband of 45 years (who has a family history of Alzheimer's disease) may need nursing home care at some point in their lives and she does not wish to exhaust all of their savings.

Questions:

1. Describe the benefits of long-term care insurance for the nurse's grandparents. How likely are they to use these services, given their medical background and ages?
2. What could the grandparents expect to pay out of pocket if they must both go to a nursing home?
3. What are some strategies for planning for care of these persons as they enter advanced age with chronic diseases?

cost for a private room in a nursing home in 2003 was $181.24/day (National Council on Aging, 2005). The average stay in a nursing home is $2\frac{1}{2}$ years with an estimated cost of $50,000 per year or more, and this is projected to increase to $200,000 per year by 2030 (Beam & O'Hare, 2003).

Long-term care insurance can be purchased at any time, but premiums increase with age. Long-term care insurance may cover any one or all of the following types of care (Beam & O'Hare, 2003):

- Nursing home care
- Assisted living
- Hospice
- Home health
- Adult day care
- Respite
- Caregiver training
- Home health care coordinators

A comprehensive policy is probably the best option for anyone who anticipates the possibility of needing several levels of care throughout the lifespan. Depending upon what the individual wishes to pay, benefits may be calculated daily with limits ranging generally from $50–$500 per day. Monthly benefits may vary greatly, from $1,000–$6,000 per month.

Nurses should be informed about the possibility of clients having or obtaining long-term

care insurance. This is a question nurses should ask of any long-term care patient. Some persons without informed family members may not realize they have this type of coverage, and those with newly diagnosed conditions that will eventually require long-term care may benefit from earlier investment in this type of insurance. Currently, only 5 million people have long-term care insurance, but there are now 120 companies that offer this type of insurance (Beam & O'Hare, 2003). Ultimately, the decision to purchase long-term care insurance rests with the patient and family, but gerontological nurses should be prepared to answer basic questions about the benefits and disadvantages of purchasing such policies. Nurses who are interested in learning more about the financial planning aspects of gerontological care may wish to consider the benefits of additional certification in one of the related areas discussed in this chapter (**Boxes 23-1** and 23-2).

Box 23-1 Helpful Web Sites

www.aifg.org (American Institute of Financial Gerontology)
www.aanlcp.org (American Association of Nurse Life Care Planners)
www.n4a.org (National Association of Area Agencies on Aging)
www.caremanager.org (National Association of Professional Geriatric Care Managers)
www.internationalacademyoflifecare planners.com

Box 23-2 Helpful Resources on Careers in Gerontology

American Association of Retired Persons (AARP)
601 E St. NW
Washington, DC 20049
(202) 434-2277
www.aarp.org

Association for Gerontology in Higher Education (AGHE). AGHE is an educational unit of:
The Gerontological Society of America
1030 15th Street NW, Suite 240
Washington, DC 20005-1503
(202) 289-9806 or fax (202) 289-9824
www.geron.org
www.aghe.org

American Society on Aging (ASA)
833 Market St., Suite 511
San Francisco, CA 94103
(415) 974-9600
www.asaging.org

U. S. Administration on Aging
www.aoa.dhhs.gov

American Geriatrics Society
www.americangeriatrics.org

John A. Hartford Foundation Institute for Geriatric Nursing
www.hartfordign.org

Critical Thinking Exercises

1. Explore the suggested Web sites for this chapter and consider the various options for obtaining certifications related to gerontology and finances.
2. Find a law student or an attorney who would informally discuss with you the advantages and disadvantages of using a life care planner in obtaining the desired settlement for a person who sustained a catastrophic injury as the result of someone else's negligence.
3. Surf the World Wide Web for life care planners. Check out the educational background and experience of those offering these services. How many are nurses? What are their credentials? What are their Web sites like? Do they offer any other services?
4. Call an insurance company and inquire about long-term care insurance. What are the monthly premiums for a healthy 60 year old versus a 75 year old with diabetes? When does long-term health care insurance become a burden versus an asset?
5. Look at the Web site www.geronurseonline.com. What specific tools from this site might be helpful in answering questions from older adults about planning for the future?

Personal Reflection

1. Are any of the certifications discussed in this chapter new to you? Would you ever be interested in combining your nursing knowledge in gerontology with some type of financial planning?
2. What would it take for you to obtain a certification or designation in one of the areas discussed here? Is this something that you might like to do in the future? If you were starting your own business and offering services to older adults, which of these certifications would be of most interest to you?
3. What do you think about long-term care insurance? Will you think about purchasing it when you are middle aged? Old aged? Why or why not?
4. What information from this chapter is useful to you as you think about working as a nurse with older adults?

Glossary

Advanced practice nurse (APN): A nurse with expertise in a certain area who holds a master's degree or higher; four major types distinguished are nurse practitioner, clinical nurse specialist, nurse midwife, and nurse anesthetist.

Chartered advisor for senior living (CASL): A certified professional who assists older persons with retirement savings, pension and social security planning, health and long-term care issues, and estate planning.

Certified Life Care Planner (CLCP): A person meeting the requirements for certification and who holds certification to develop life care plans.

Chartered senior advisor (CSA): A designation that is offered by the Society of Senior Advisors to persons completing a course of study that prepares them to advise seniors in matters of finance and planning.

Financial gerontology: Combines the knowledge and skills associated with financial planning and asset management with expertise in meeting the unique needs of older adults.

Life Care Plan (LCP): A comprehensive document designed to help meet the long-term financial and health needs of a person who has experienced a catastrophic injury.

Long-term care insurance: Insurance designed to cover individuals needing health care outside of the hospital, including diagnostics testing, rehabilitation, or custodial care.

Registered Financial Gerontologist (RFG): A person certified to provide services related to comprehensive financial planning with older adults and whose curriculum emphasizes knowledge of the aging process.

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