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# Investing in E-Health

## What it Takes to Sustain Consumer Health Informatics

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# Investing in E-Health

## What it Takes to Sustain Consumer Health Informatics

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# Foreword

The U.S. health system is not as safe, effective, or efficient as it needs to be. Furthermore, care is too often not delivered in a timely manner, personalized to patient needs or provided to those in need regardless of race, ethnicity, gender, or socio-economic status. While addressing these challenges will require a comprehensive multi-level approach, most observers agree that there is great need for widespread adoption and implementation of electronic health information technologies (HIT). Yet HIT (like many other technological innovations) is mired in old models of adoption and implementation that are slow at best and very often simply ineffective. Over the past 5 years, the authors of this book have been studying a variety of attempts to adopt proven HIT, aimed at supporting patients and their families as they face serious health problems and have seen the importance of leadership, the value of managing organizational turbulence, the contribution of efficient implementation support, and the essential role of sound technology itself to successful use.

Innovations are not adopted nearly as fast in healthcare as they are in other industries. How long has it taken, for instance, to see real progress in the area of electronic medical records? For well over 20 years, some of the leading healthcare institutions have been operating such systems. Yet until very recently these were considered as isolated examples that could not be replicated elsewhere. Proven innovations and evidence-based practices only rarely become standard practice. Why? What factors prevent the adoption and implementation of innovations, particularly technological innovations? Clearly, multiple issues are involved. The innovation itself certainly plays a central role. Rogers' considerations such as compatibility, observability, relative advantage, trialability, and complexity all play a role. But so do the staff of the organization, its structure and leadership, and the environment within which it functions. The complex interaction of these variables determines the ultimate outcome.

This is particularly true with respect to innovations that are implemented through a healthcare provider organization but primarily benefit the patient rather than the organization itself. Interactive Health Communication Systems (IHCS) or e-Health systems are a prime example. These systems have been shown to improve quality of life of patients, and early data suggests that they can have positive effects on family caregivers as well. Often these technologies are offered through and promoted by the healthcare provider. In a sense the provider has little to gain from them. They may even reduce utilization, which in some financing arrangements can damage the bottom line of the organization.

When there is such a disconnection between the benefit that these systems offer to patients and their families and the lack of direct benefit to healthcare providers, the implementation process becomes a very complex issue. It is this issue that these authors address. They are well suited to do so. Between them, they have led the development and testing of some of the premier IHCS in existence today. Gustafson and Hawkins led the development of the Comprehensive Health Enhancement Support System (CHESS). Their numerous randomized trials provide evidence of the benefits to quality of life, social support, and participation in healthcare. In a similar vein, Brennan and her colleagues pioneered Heart Care and other technologies aimed at helping patients cope with severe illness such as HIV and heart disease. Together they have made numerous efforts to implement their systems, and they have had mixed successes.

Hence the question returns: How do organizations inhibit or promote the adoption and implementation of innovative practices, especially those that benefit the patients but not the healthcare providers? And is there a tool that organizations can use to enhance the likelihood of successful and appropriate implementation?

This book addresses this question. Based on strong theoretical foundations they have gone beyond assessments to create a practical tool that can be used by organizations wishing to implement an IHCS, and have tested it in a variety of organizations and with a variety of technologies.

Finally, they have illustrated their work through several compelling case studies built around attempts to implement one of their IHCSs, CHESS. Some have been quite successful while others have failed. This book presents an insightful examination of those attempts based on the model they developed.

This is an extremely insightful, practical book that will be of great benefit to everyone interested in spreading e-Health technologies – caregivers, executives, policy-makers, purchasers, payers, and the research community. We cannot afford to wait.

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# 1

# Patient-Focused Technology and the Health Care Delivery System

Patricia Flatley Brennan

The promise of e-health is upon us! Specialized, patient-focused computer systems – such as health-related websites, consumer health informatics tools, patient portals to hospital records and clinical resources, and palm-top reminders for medications and disease management – help lay people and their family caregivers better understand their health challenges, participate in health care choices, cope with the implications of disease and injury, and maintain contact with their clinical care providers. These innovations are acceptable to lay people, young and old, help reduce health disparities and increase knowledge of, and involvement in, their own health care processes, and provide ongoing, point-of-living monitoring of complex health problems. Through use of these easily accessible innovations, patients and their family caregivers have greater sense of control over their own health care, and physicians, nurses, and health educators gain a better understanding of the day-to-day experiences of people facing complex health problems. Yet, most of these innovations emerge as freestanding, single-purpose interventions, reaching only those who stumble on their presence on the Web or those fortunate enough to obtain care from visionary clinicians who direct their patients to these valuable resources. It is the intent of this book to provide a theoretical basis and a series of experiential learning observations in such a way as to foster more rapid, effective implementation of innovative computer systems for patient use.

Interactive Health Communication Systems (IHCS) generally employ computers to deliver health information, coaching and communications resources, and clinical information to lay people. Guided by a range of theories from health behavioral change to social marketing, these resources purport to help laypersons better understand, cope with, and manage their health concerns. Some IHCS are condition-specific, bringing specialized knowledge and support to persons who share a common concern. Others are more general purpose, providing access to a range of health-significant information. Most systems are designed to be freestanding and not linked to a patient's clinical record, but recent changes both in technology and in public policy portend greater integration of consumer information and clinical records.

It is timely to bring health care 'online,' not simply through creating clinical records and billing systems but through the selection and systematic deployment of consumer health innovations that help health care organizations and practitioners achieve their clinical service goals. Gaining full value from consumer health tools requires re-engineering of clinical care services. Integrating electronic health innovations into the portfolio of care services provided by a health care organization demands purposeful, systematic strategies that insure realization of the promise of these innovations for achieving clinical care goals and organizational objectives. Exploring the challenges and barriers, facilitators and enhancers, of implementing clinical computing innovations for patient care provides a guide for others interested in expanding clinical care services through direct-to-consumer computing tools.

This book will be of interest to many readers. It targets clinical care providers (physicians, nurses, health educators, psychologists) and product line managers for complex services such as cardiovascular health or cancer treatment as well as health systems administrators who recognize the limits of meeting patient care needs through traditional service strategies. Additionally, students of innovations of all types will find many new insights among the interesting case studies and informative analyses presented here. Finally, policy-makers and those who finance health care services will find among these chapters a clear illumination of the elements necessary to successfully implement technology extensions of health care services.

This book will be of particular interest to medical informaticists. It offers a view into the ‘people and organizational issues’ that challenge the process of moving from prototype devices to fully implemented systems. It offers an unusual view on the user group – moving beyond the individual sitting at the computer screen to the contextual care team, exploring the perspectives of the visible and invisible members of the clinical care team, including nurses and physicians, registration desk clerks, clinic administrators, and the information systems department. The text highlights, but does not resolve, significant challenges in medical informatics, such as the articulation of psycho-educative information systems with clinical records systems, human computer interface from the perspective of users not only naïve to computing but also naïve to the clinical care process, and the importance of consumer vocabularies in clarifying and communicating clinical concerns of consumers.

## 1.1. Where Does Patient-Focused Technology Fit in Health Care Delivery?

Contemporary health care is challenged on many fronts. Accomplishing health care outcomes requires that patients and their families be actively engaged in their care. Their critical role as co-creators of health outcomes demands the presence of effective, easy-to-use information technology applications that both extend the reach of clinical care providers and support patients and their families in their self-monitoring and care tasks. Creating parallel but independent information systems is wasteful and may impede timely, effective care delivery.

Information technologies, particularly those developed with the patient and family as the anticipated direct users, complement and extend existing health care services. They provide pathways for communication and information exchange. Information technologies create an environment where patients and their families can explore clinical records or health education programs at a time, and with a level of privacy, that best meets the patient's preferences. Information technologies, properly integrated with clinical information services, provide a platform for creating personal health records that facilitate self-awareness and promote self-monitoring. This level of understanding of the patient's trajectory of health care concerns and human responses enhances the patient's and family's role as informant, co-decision-maker, and partner in care.

Health care services in the United States are characterized by many misalignments, which can add challenges to patients' and families' full participation in their care. Chief among those is the fragmented approach to service delivery and care financing, which necessitates an episodic approach to clinical practice. That is, patients receive care in discrete units of service within which individual problems may be addressed and ameliorated but which lack attention to continuity over time, ongoing care demands, and care monitoring needs. Yet it has long been evident that an episodic approach to care over-responds to emergent symptoms without any incentive or opportunity to put into place the services that support long-term health behavior change, facilitate the clinical investment necessary to remain engaged in a care process, or provide the health education services that supports self-maintenance. Effectively designed information technologies have the potential to 'bridge the gap' between care episodes. Institutional investment in direct-to-consumer health information technologies (HIT) makes sense to the extent that this investment serves to meet organizational goals and is likely to fulfill the success criteria held by the organization.

The Internet affords an institution the ability to extend services beyond its own walls, and thus provides a particular advantageous environment for institutions that want to use technology to achieve complex patient care goals. The Internet has had one of the fastest rates of adoption of any innovation in history. It took 20 years since its inception as ARPANET, to have enough home computers, applications, and ease of use to allow the Internet to reach critical mass (enough people using it, for it to be self-sustaining). But it took only 11 additional years for it to be adopted by nearly half of the US population [1]. At the time of writing, 72 percent of Americans report using the Internet. Of those users, 91 percent use e-mail and 67 percent have made purchases online [2]. According to the Pew Internet and American Life Project, the growing ranks of experienced Internet users, as well as the deepening reach of the Internet into all aspects of American culture, have raised all Americans' expectations about what is available online. A large share of Internet users now say that they will turn first to the Internet when they next need information about health care or government services. Sixty-six percent of users look for health or medical information online and 58 percent regularly visit a website that provides information or support for a specific medical condition or personal situation [2].The Web has become the ‘new normal’ in the American way of life and those who do not go online constitute an ever-shrinking minority [3].

One of the key reasons for the growth in the Internet is the increasing availability, usability, and acceptance of computers. Today it is possible to purchase a fast, Internet-ready, desktop computer for about $400 with laptops costing as little as $600. Internet appliances are even less expensive ($100–$500) and may soon actually surpass desktop computers on some dimensions of functionality. For example, several vendors have recently begun to offer Internet appliances that eliminate the need for a mouse by having users touch a large, wireless, hand-held screen with a pen. Whatever the configuration, computer technology offers great promise in helping institutions meet their patient care goals.

Thus, the time is right for institutions to explore how to best use the Internet as a pathway to providing care for patients. Experimentation is necessary, even desirable, as learning institutions and the technologies they evaluate continue to grow and evolve. Exploration of the experiences of several organizations experimenting with a proven, innovative IHCS offers many lessons to the reader.

## 1.2. Achieving Success with Interactive Health Communications Systems

Determined investment in IHCS must arise from the goals of the organization itself. Organizations are motivated to participate for many reasons – the technology’s fit with their institutional mission, the cachet of research participation or being technically innovative, the desire to try new ways to achieve sustainability of other organizational operations, such as patient education or appointment scheduling. It is critical that the decision to implement such a technology be made recognizing that this means more than an investment in a piece of software; it is an investment in a process of design, a philosophy of patient-and-family engagement, and a vision that rests care strategies on dissemination of health knowledge and facilitation of peer support. It is also important for decision-makers and implementers to understand that the decision to adopt such an innovation is only the first small step in realizing its potential benefits to the organization and to consumers. Adoption of a computer innovation is just the starting point of a long, and often challenging, process of implementation.

Implementation of innovative approaches to achieving operational goals necessitates defining success in many ways. In situations where an organization seeks specific interventions for care of patients with a particular disease process, demonstrating that the innovation is effective within that patient population and their family system is essential. Sometimes an institution seeks experience with a particular technological approach; demonstrating the ability to integrate the technological approach into the institution’s repertoire of resources constitutes success. A third definition of success occurs when the innovation’s impact on significant organizational mission components is determined. Finally, as is common with experimental strategies, an innovation may be considered successful with the implementation of the general concept of the innovation, whether or not a specific instance of that innovation remains viable.

It is the central thesis of this book that successful implementation of IHCS is a function of characteristics of the organization itself, the nature of the technology, and the manner in which the innovation is introduced into the organization. We frame these considerations as a Readiness for Implementation Scale (RIS).

## 1.3. Readiness for Implementation Scale

Through a process integrating expert judgments, extensive field testing, and intensive case studies, our team developed a framework for assessment that can aid organizations, clinicians, and treatment managers in planning, adopting, and implementing consumer-focused technology interventions. Our panel of experts identified seven key factors that contribute to successful implementation:

- Organizational Environment
- Organizational Motivation
- Technology Usefulness
- Promotional Strategy
- Implementation Process
- Department–Technology Fit
- Key Personnel Awareness and Support.

These factors will be addressed more extensively in chapter 5, Implementation Model Development and Testing. Clinicians and administrators can use these factors to appraise their organization's readiness to adopt and innovate, determine the extent to which the current state of the innovation will tax or capitalize on existing resources and directions in the organization, and get a fair appraisal of both the investment needed to make the innovation a success as well as the likely pay-offs to arise from these investments. Using this framework can help institutional planners determine whether the institution is ready to make the commitment to adopt and innovate in this manner.

We stress that there is no 'ideal' configuration of responses to these factors – rather careful study of each factor illuminates to the organization and to innovators' dimensions of success. Clinicians and administrators can appraise their organization's readiness to adopt and innovate, determine the extent to which the current state of the innovation will tax or capitalize on existing resources and directions in the organization, and get a fair appraisal of both the investment needed to make the innovation a success and the likely pay-offs to arise from these investments. Using this framework can help institutional planners determine whether the institution is ready to make the commitment to adopt and innovate in this manner.

This text provides a principled approach to support health care managers, clinicians, and educators who wish to complement clinical services with interactive health technologies. We first present a detailed description of one of the best-known, and most extensively tested, interactive health technologies – the CHESS system. CHESS, the Comprehensive Health Enhancement Support System, was developed at the University of Wisconsin–Madison over the past 15 years. CHESS provides lay people with Internet access, an integrated suite of resources including educational instructions about disease processes, self-care advice, professional consultation communication with others who share similar care concerns, and tools to help them make and implement key decisions about their health and health care. Using short video interviews and texts of personal stories, CHESS introduces lay people to others who have faced and managed similar health problems. CHESS helps in care and care management decision-making by providing lay people with specialized tools that help them clarify values, weigh alternatives, and explore their own experiences. CHESS is an 'industry standard' for consumer health informatics innovations that includes four key components believed essential to promoting individual self-management: information, peer support, professional counseling, and self-monitoring. It serves as a prototype for hundreds of clinical and health-focused consumer informatics innovations. This book provides an extensive exploration of how CHESS, as an exemplar of technology-based direct-to-consumer interventions, has been implemented through a series of research projects. The lessons learned provide insight for any type of IHCS implantation. In fact, other ICHS were included in the validation of the implementation model.

Next we provide an overview of the relevant literature on innovation and organizational issues in the implementation of innovations followed by considerations for successful technology implementations. Then we present a model that will allow organizations to assess their readiness to adopt interactive health care technologies. Drawn from the literature and the wisdom of experts in innovation, technology, and health care, this model allows an institution not only to benchmark its progress toward implementation, but also to determine where to invest resources to increase the chance of successful implementation. Six case studies describing a range of health care institutions' experiences with adopting and implementing CHESS illustrate both the critical success elements from the model and highlighting factors, which facilitate or impede implementation. Finally, we summarize the major lessons from the case studies and explain how organizations can use this same model to integrate interactive health technologies into their suite of services.

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# 2
# CHESS: Translating Research into Practice

Robert P. Hawkins and Susan Dinauer

To provide context for the case studies that comprise the core of this book, this chapter will present both a description and some history of the IHCS that was the subject of these adoptions and implementations. CHESS aimed to provide an interactive, user-driven system on a computer via a number of specific disease-focused modules combining information, social support, and decision and planning tools to patients facing a health crisis. Typically, such a health crisis produces enormous stresses on the patient and the family, which require substantial coping responses [1] as they respond to the threat posed by the diagnosis, learn about the disease and its treatments, make treatment and other decisions, seek sources of emotional and practical support, and so on. The premise of CHESS was to assemble in one place and in an integrated form the resources needed for effective coping, to be a continuing presence in the lives of its users, and thus improve quality of life. CHESS would be available at any time of the day when most convenient or most needed by the patient and family.

One contrast with many other IHCS is particularly important. IHCS that focus on primary prevention or lifestyle behavior changes have the challenging task of creating or maintaining a "tension for change," or even a challenge of attracting users and maintaining their attention in the first place. In contrast, CHESS began with life-threatening diseases, such as a recent diagnosis of cancer, HIV, and coronary artery disease, where people are typically highly motivated to obtain information and support. Hence it focuses on providing deep content instead of mechanisms to attract users or create tension for change. Later additions serve people managing chronic conditions such as heart disease, asthma, smoking cessation, and dementia care, but these also have assumed user motivation.

The other key issue considered here is the dissemination of CHESS. Since CHESS was developed in a research environment, initial usage of CHESS modules was confined to individuals participating in research studies. However, the developers also recognized the need to further understand how to implement CHESS in a clinical environment. A research consortium comprised of health care providers was formed in part to better understand how CHESS could be integrated into clinical practice.

## 2.1. The CHESS System

CHESS is an information and support service delivered to individuals over the Internet. CHESS is freestanding; that is, it does not need to be embedded in an institution's electronic patient record system and can be accessed through computers linked to the Internet. Users view CHESS resources through browsers with a unique code name and password.

CHESS was developed by researchers at the University of Wisconsin starting around 1990, although its roots are obvious in at least one precursor system. CHESS modules dealing with a specific health crisis or disease are built around both a topic structure and a set of services. The particular topics (typically 20–30 subsuming several hundred more-specific keywords) are of course different for each disease, but in each case that structure is developed through a combination of reviewing literature, clinical knowledge, focus groups and interviews with patients and family members, and a quantitative needs assessment process typically involving hundreds of respondents [2, 3]. Since the resulting topic structure varies by disease, it is much more useful to describe CHESS overall through its services – the particular ways of responding to patient and family needs. Since its inception, CHESS has provided three different kinds of services: Information, Communication/Support, and Planning or Analysis Tools. Describing them will give a sense both of what CHESS is and how it facilitates improvement in quality of life.

*Information Services* provide information on an extensive list of topics in a variety of formats. *Questions and Answers* include brief answers (most displayable as a single screen) to many (typically more than 400) frequently asked questions about the disease by displaying only the much smaller sets associated with a topic or particular keyword. As an alternative to this single-focus mode of dealing with information, the *Instant Library* provides hundreds of complete articles drawn from the scientific and/or popular press. These were initially copied whole into the system (with copyright permission when not from the public domain), but later evolved to be links to their sources on other websites. The *Resource Guide* typically provides descriptions to help users visualize what it will be like to receive a service, such as disability assistance or hospice, or what it will be like to have breast-conserving surgery or chemotherapy. It then helps them learn to identify a good provider and be an effective consumer. *Personal Stories* are first-person accounts of how individuals coped with their health crisis. Professional writers interview patients and their families and then attempt to maintain that person's "voice" in telling their stories, both in an overview version and in expansions on topics the needs assessments indicate are likely to be of greater interest to some readers than to others (e.g., what it was like during chemotherapy, dealing with an insensitive doctor, fighting a health insurance company, etc.). Later CHESS versions also provided *Video Gallery* versions that allow users to see patients (and in some cases their spouses as well) talk about how they coped with the disease and its treatment. *Resource Directory* provides descriptions of local and/or national services and ways to contact them. And after CHESS itself became Web-based, *WebLinks* provided direct connections to other high-quality websites specific to the disease.

*Communication Services* offer both information and emotional support to users. Patients and their families use bulletin board style *Discussion Groups* to share information and support. There are separate groups for patients, partners, and a group open to any CHESS user, and some CHESS modules have employed topical groups as well (e.g., faith, end-of-life). Groups are limited to 50 members and monitored by a professional facilitator. *Ask an Expert* allows users to ask very specific questions, often about situations too specific to be covered by *Questions and Answers*, and then to receive a confidential response from knowledgeable specialists. To illustrate the kind of expertise involved, CHESS cancer modules have subcontracted with National Cancer Institute's (NCI's) regional Cancer Information Service (a telephone-based information service) to have questions answered by Cancer Information Specialists. As an additional feature in later CHESS versions, question–response pairs thought to be more generally useful were depersonalized and made available for all users within *Open Expert*. Also in later versions, *Journaling (My Diary)* provides a private (content saved only on the user's computer) place where users write their deepest thoughts and feelings about the disease and treatment in a timed, controlled environment. The system provides guidance about what sorts of journal entries are likely to stimulate useful self-reflection or analysis.

*Analysis Services* are intended to help users think through key issues they are facing. These interactive services collect data from the user, process it, and provide feedback. CHESS *Assessments* do not offer general Health Risk Appraisals. Rather they focus on specific issues of importance to people managing complex illnesses. In *Health Tracking*, people enter data on their health status every 2 weeks and see graphs illustrating how their health status is changing. In both *Assessments* and *Health Tracking*, CHESS uses that information to guide people to other material relevant to their situation. *Decisions* uses two formats to help patients and their families examine important treatment decisions. Video clips show patients talking about how they made their decision. Alternatively, they can use a structured decision analysis to learn about options, clarify values, and learn consequences of choices. *Action Plan* employs a statistical decision theory model (employing concepts of Self-Efficacy and Theory of Reasoned Action) to help users plan behavior changes by identifying goals, resources, and ways to overcome obstacles. CHESS development and testing in 2005 added several other analysis services. *Clinician Report* uses a version of *Health Tracking* to allow the patient and caregiver to make a report to the clinical team either just before a scheduled visit or when a status indicator exceeds a threshold indicating a problem. *Easing Distress*, a cognitive behavior therapy program, provides tools to help patients identify emotional distress and avoid being caught up in it, and *Healthy Relating* provides training in effective communication. CHESS for pediatric asthma integrates a nurse case manager into the system, and one version of CHESS for breast cancer now provides a human cancer information mentor to supplement and enhance the system.

It is illuminating to contrast CHESS use with typical Internet access. First, the Internet is a vast repository of information about health (and many, many other things as well), but that repository is unfocused and of varying quality. CHESS is a non-commercial system, owned by the University of Wisconsin, whose content and presentation is developed and updated by CHESS staff with input from clinicians and patients. Second, the Internet provides support through chat groups involving large numbers of people, some of whom can be pretenders. CHESS (by design) limits discussion and chat group access to a comparatively small number of registered people in a facilitated environment. Third, Internet interfaces vary substantially between websites and can be cumbersome. CHESS provides one easy-to-use interface that takes users to important materials within its own boundaries and to specific pages within other websites without having to learn to navigate each site. And fourth, the most important strength of CHESS may be that it provides a closed, guided universe of information and support options in an integrated package where everything points efficiently to everything else, instead of requiring search and discovery.

Patients typically get access to CHESS through their health care provider. Many organizations that offer CHESS also lend computers to patients who do not have their own, something that has become progressively less necessary. Some organizations also offer CHESS in their patient education libraries.

When users log on to CHESS they enter a code name and password to insure that they are registered users. They see a main menu from which they can choose a general topic, pick a particular keyword, or enter into a service of interest (Figure 2.1). The "interactivity" of the CHESS modules employed in the case studies in this book comes from the complete control over choice of content given to the user and the system's responsiveness in returning requested information, support, or analysis. CHESS is not designed to force people to use particular

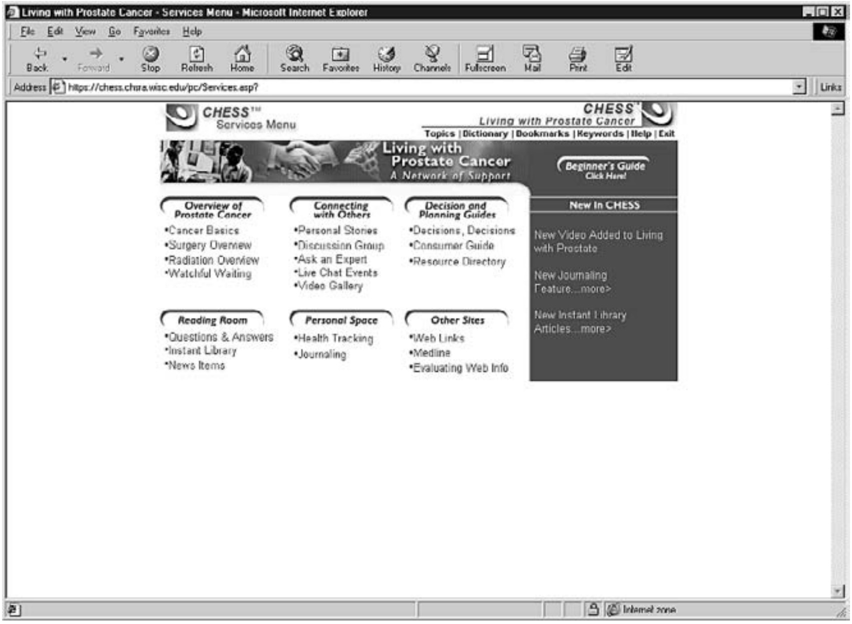

FIGURE 2.1. CHESS Internet version – home page.

parts of the system, relying instead on providing information and support in several formats that allow the user to pick the presentation that best fits their learning style. However, versions developed in 2005 track user characteristics such as disease and treatment details or immediate concerns to provide more “tailored” or “personalized” content to the individual. And the next step will be to track what CHESS content the user has explored to further tailor suggestions.

## 2.2. Research and Development Process

The roots of CHESS lie in an earlier system developed in 1981 by the same research group to address key adolescent health issues. The Body Awareness Resource Network (BARN), funded by the W.K. Kellogg Foundation, initially used Apple II computers placed in middle- and high-school instructional media centers to help teens prevent or reduce smoking, drug abuse, and unsafe sexual activity. On those early personal computers, the system used minimal, simple graphics and resided entirely on floppy disks. Despite adolescents’ supposed lack of interest in health (though perhaps in part because of their interest in computers, then quite novel), BARN attracted substantial use and demonstrated the effects it was designed to achieve [4–6]. The system used games, direct address, and a breezy, irreverent personality (“BARNEY”) to attract and hold adolescents’ interest. It helped them sort out myths from reality, consider consequences of choices, and make better decisions.

When BARN’s developers turned to adult health issues in the early 1990s, computers were more powerful and widely available, so novelty alone was unlikely to be as attractive, particularly for adults. Instead, CHESS aimed at people facing health crisis – those whose motivation to deal with the health problem could be assumed, and who were likely to recognize that they needed a mix of information, support, and tools to deal with the crisis. A 5-year grant from the W.K. Kellogg Foundation supported the original development of the overall CHESS structure, and grants from several federal agencies supported research to evaluate specific versions of CHESS.

Initial CHESS modules, covering topics such as AIDS/HIV, Breast Cancer, Adult Children of Alcoholics, Making It in School, and Surviving Sexual Assault, were all stand-alone, DOS-based systems residing on the computer’s hard drive, although from the start there was also a modem-based connection to the Discussion Group with other users and with experts through the Ask-an-Expert service. The DOS base meant that graphics were very simple, and that users navigated by using arrow keys to move across menu options. Nonetheless, even in this simple form, patients randomly assigned to have a CHESS computer in their home typically used it frequently for long periods of time, expressed great satisfaction with it, and had better quality of life than those receiving usual care [7, 8]. Patients with HIV/AIDS also report significantly less use of medical services and thus indicated that CHESS reduced medical costs.

With the encouragement of the initial randomized control trials, the mid-1990s saw significant changes in CHESS. First, the clunky DOS-based system was replaced by a true graphical interface, at first still resident on a local computer but quickly migrating fully to the Internet.

As will be obvious to most readers, the shift to health information and resources residing on the Internet has tremendous advantages, by allowing continuous updating and linkages to other resources far beyond those that could be placed on a single computer's hard disk (for both space and copyright reasons). On the other hand, accessing locally stored materials involved only negligible delays, whereas Internet access, especially through phone lines, can involve delays that are a significant burden on the user. CHESS programmers have worked since then on a variety of ways both to reduce the number of downloads and to make each as efficient as possible.

As the use of the Internet grew, researchers and policymakers often expressed concerns about two key Digital Divide issues: (1) that a disadvantaged group (or such groups in general) will have less access to computer-based systems and (2) that even when access is provided, members of disadvantaged groups will make less, or less effective, use of such systems. CHESS trials have provided computers to patients, making the first issue moot as a research question (it remains an issue, though a decreasing one, as computers and Internet access become less unusual among disadvantaged households although high-speed access is not yet widespread). In contrast, a variety of CHESS research presents a very different picture. Among breast cancer patients, less educated, uninsured, or minority women used CHESS just as much as advantaged women, and in fact often benefited more [8]. The trial with AIDS patients came at a time when women could be considered disadvantaged in computer experience and efficacy compared to men (not to mention being a small minority among AIDS patients). Nonetheless, the trial found that women, along with minorities and the less educated, again used CHESS as much and with similar effects as advantaged patients [7, 9]. Non-experimental trials provided additional evidence that elderly women [10] and very poor women [11] use CHESS in similar amounts as advantaged women and show comparable or greater pre-test to post-test improvements in quality of life.

A second ongoing change has been the addition of CHESS modules in a number of new clinical areas, such as Adult Caregivers of Dementia Patients, Prostate Cancer, Heart Disease, Lung Cancer, Smoking Cessation (adult and teen versions), Menopause, Pediatric Asthma Management, and Caregiving for Advanced Cancer Patients and Bereavement Support. The decision to develop a new module came about in a couple of different ways. Sometimes the organizations currently using one of the early CHESS modules saw a need among one of their other patient groups for a system like CHESS. Many times, clinicians initiated this request and could provide the clinical expertise needed to develop new content. Other times, new organizations or research centers approached the CHESS developers about collaborating on a module to enhance current services or research goals.

Each of these new modules has involved another substantial needs assessment research process, followed by the involvement of clinical experts with CHESS staff to develop the particulars of the new module (even though all so far have still been recognizably CHESS within the initial model outlined above). Importantly, the varied experiences with the initial broad range of CHESS modules led to an insight that has strongly shaped subsequent development directions. It appears that it is not enough to develop a tool that will be useful to those facing a health crisis. A key additional issue is how to identify those people and connect them with CHESS. And it appears that the most effective way so far is to focus on crises where people have close connections with an identifiable group of clinicians, who could identify and recruit potential users of CHESS.

And the third change, more subtle and ongoing, has been the gradual addition of new services or the enhancement of older services that were described in the initial presentation of CHESS structure. Although this was in fact gradual, the process received an important boost from a technology transfer grant (STTR) that focused on developing tools (such as Health Tracking and Bookmarks) that then spread through the CHESS modules and have evolved into various ways of making the system more responsive and individual.

## 2.3. Dissemination and Implementation of CHESS

The other main event in CHESS history of the mid-1990s was the creation and growth of the CHESS research consortium. The founder and developers of CHESS recognized that its eventual integration into clinical care would be facilitated by constant and persistent engagement with the health care providers who would be the most likely to connect CHESS with potential users. These providers would share developmental responsibilities with the CHESS team providing content that met local standards as well as serving as a site for research and development. This group of leading health care institutions was intended to be a mechanism to test disseminating CHESS beyond research settings and a source of clinical expertise and financial support for developing additional CHESS modules.

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### A Closer Look: Dissemination of an IHCS

Offering an IHCS through a consortium effort was a non-commercial approach to disseminating this type of technology. Consortium members not only were offered technical support from the developers, but also had the opportunity to participate in research studies and network with other organizations also implementing this same technology. The collaborative nature of the consortium was an important benefit to the members.

Members would share implementation strategies and learn from each other about successful (and non-successful) efforts to deliver CHESS to patients. As their experience grew, the consortium members along with the developers gained a better understanding of the types of people who needed to be involved in an implementation. A key role at the organization was to designate someone as the overall CHESS coordinator, a critical contact person for patients, clinicians, and administrators. Depending on the size of the organization, the coordinator may also be responsible for recruiting or training new CHESS users, but those roles could also be handled either at the clinic level or by additional CHESS staff.

The members' firsthand experience at disseminating CHESS also guided development and highlighted activities most valuable to an implementation. For some organizations this knowledge would be translated into developing an IHCS of their own.

Before 1993, CHESS staff invested a lot of time to develop the consortium idea and recruit the first members. A key member came on board in 1993, but membership grew slowly and the developers were uncertain if the whole idea of the consortium was going to work. However, beginning in 1995, members joined regularly for the next few years. Although membership levels fluctuated over the 10 years the consortium was active, the membership at its peak in the late 1990s included nine organizations ranging from university research-based health care groups to managed care organizations (Figure 2.2).

Each member organization paid an annual consortium fee, and in return were the first invited to partner with CHESS in research grants and activities; influenced decisions about new module topic development and enhancements; and received permission to offer CHESS modules to any of its patients as long as CHESS staff could analyze use data from that organization. (Table 2.1 provides information on modules used by each case study organization.) Members also received implementation and technical support from CHESS staff including on-site visits to promote CHESS within the organization and work with staff on recruitment and training procedures; regular facilitated calls and other communication among consortium members; monthly use reports; toll-free technical support for users; and internal marketing materials. Members developed implementation procedures that fit best for their organizational setting, as will be illustrated by the case studies later in this book. Members participated in research projects with CHESS, ranging from controlled studies to demonstration projects evaluating a variety of implementation best practices.

### A Closer Look: Costs

In addition to the $40,000 annual membership fee to join the consortium, organizations needed to provide other financial support to assure CHESS would be successfully implemented. A staff member was needed to act as overall CHESS Coordinator at the organization with responsibilities that ranged from promotion of the system to a diverse audience (administrators, clinicians, technical staff, and the end-user (patients and their families)) to recruitment of patients to training and other support for CHESS users. In most organizations, laptops were purchased to loan to people who did not have access to a computer to assure that there would be no costs for the patient who wanted to use CHESS.

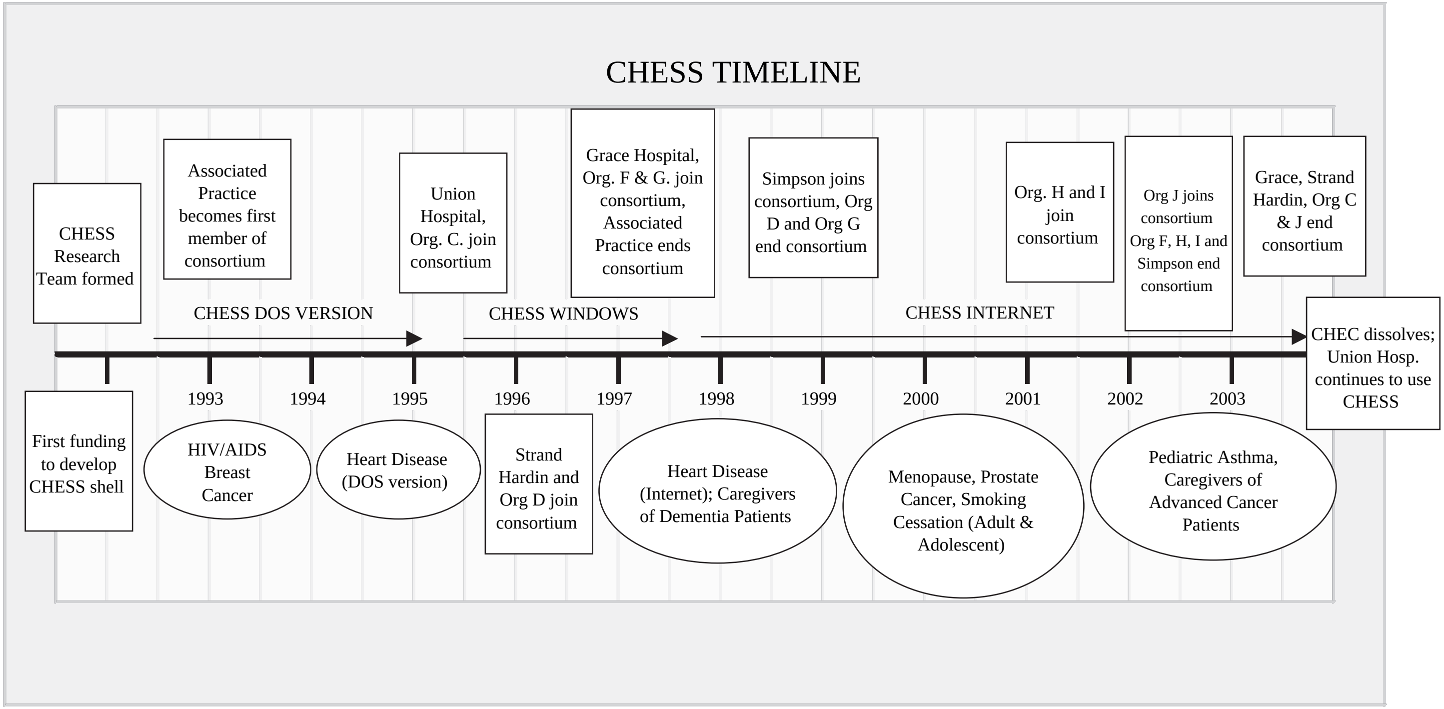

FIGURE 2.2. CHESS Timeline.

Table 2.1. CHESS modules used at case study organizations.

| CHESS Module/ Organization | Asthma module | Breast cancer | Alzheimer's disease | Heart disease | Teen smoking | Prostate cancer | Menopause module | Adult smoking | HIV/ AIDS |
|---|---|---|---|---|---|---|---|---|---|
| Grace Hospital | | X | | X | | | | | |
| Union Hospital | | X | | X | | X | | | |
| Simpson | X | X | | | X | X | | | X |
| Associated Practice | | X | | | | | | | X |
| Strand Hardin | X | X | X | X | | X | X | | X |
| Caregiver Resource Ctr Network | | | X | | | | | | |

Consortium members pushed the move from a stand-alone to an Internet-based system, supported the development of the heart disease and asthma modules and helped developers (and each other) find creative solutions to dissemination challenges (e.g., two members developed and spread the concept of on-line rather than manual registration). Members also met annually to keep up with CHESS progress and to contribute to its content, design, and testing. Many of the case studies reported in this book were in fact carried out at consortium members' health care facilities.

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### A Closer Look: Creating Evidence – Demonstrating Value of Use

Evaluation is an important part of implementing an IHCS. For the developers, research trials were needed to prove the benefit for people using CHESS. Many consortium members were also primarily interested in the research aspect of the consortium, both as a partner with the developers and their own research efforts in one or multiple CHESS modules. Others were simply interested in overall user satisfaction with the system. This evidence was valuable in light of the costs associated with implementing these types of systems. The dissemination of CHESS through a research study also provided some challenges for recruitment because of eligibility criteria and study design; that is, in some studies patients did not receive CHESS at all if they were randomly assigned to a control group. In addition, there was competition for research subjects with other studies being conducted at the organization.

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# 3

# Theory and Literature Review

Robert P. Hawkins and John Fellows

The case studies in this book examine the degree to which a number of health care organizations managed to implement interactive health communication systems (IHCS). Understanding what works, and what does not, in a useful and generalizable way requires use of relevant theories of change as frameworks within which to recognize individual events as instances of general categories. As background to those theories, we will first overview the problems and opportunities health care organizations present for developers and marketers of IHCS.

Delivering IHCS to consumers or patients through health care organizations builds in a peculiar structural problem and opportunity. On the one hand, it makes enormous sense to use the organization to identify interested consumers and deliver or recommend the system to them. On preventive health issues, consumers tend not to be motivated to seek out health information, and health care professionals can use routine visits as occasions to direct them to IHCS that could stimulate preventive behaviors. For both acute conditions and the management of chronic illnesses, one can more often (though not always) assume consumer motivation, but that motivated consumer still faces a chaotic mass of potential resources. In these cases, the health care organization is important because it is generally the best place to identify and locate concentrations of patients and their families as they face any particular condition, and also because that is where people often go to seek help. The health care specialists who treat a particular condition are ideally placed to recommend high-quality IHCS that can help consumers with that condition. For example, pediatric asthma patients and their families can be identified and be prescribed an IHCS asthma management system by pediatricians and pulmonary specialists. A system for breast cancer patients can be delivered through surgeons, oncologists, and radiologists (or ideally through a breast specialty clinic). A cardiac rehabilitation and management tool should be recommended by cardiologists or incorporated into traditional rehabilitation programs, and so on. Whether IHCS referrals should come from specialists or primary care physicians will, of course, vary depending on who is providing care at the appropriate time, but the overall point that clinician referral will be useful is clear.

However, the significant problem here is that the primary beneficiaries of the IHCS are thus not the same as who initially adopts it. What we mean by this is that the IHCS we discuss here are intended for use by health care consumers – patients, their families, and potentially other friends and supporters as well. Phrased differently, they are mainly intended to be used by customers of the organization rather than the organization itself. Although a health care organization, or more exactly a specific clinic or set of professionals within that organization, may be best positioned to identify and refer potential users, those professionals themselves are generally not the intended users, nor are they the primary beneficiaries. Furthermore, although the professionals themselves may agree that the results the IHCS proposes to achieve are worthwhile, those benefits are often not the primary focus of the professionals' own practice and of their interactions with the patients. For example, patient knowledge of breast cancer treatment options and decreased emotional distress may be desirable, but the oncologist's focus will be much more on the details of pathology and specific chemotherapy alternatives. Thus, developers of IHCS are in the logical, perhaps even necessary, but nonetheless difficult position of creating change secondhand (an important exception that becomes a selling point is when the IHCS can claim to reduce exacerbations of chronic disease or other sources of health care costs).

Three separate areas of theory may be relevant to understanding both the degree of success and the processes involved that lead to or inhibit implementation of IHCS in health care organizations. Because IHCS present a new way of serving consumer/patient needs, they are almost always innovations from the organization's perspective, and thus the broad range of theory and research on the *diffusion of innovations* may be applicable. A related but separate set of theories address *organizational change* and examine how organizations themselves change or are changed in their structure and/or function. The third set of theories, which are much less developed than the first two, address *implementation*. This chapter will provide a brief overview of each of these areas of theory, and then discuss the extent to which each applies to the challenge of implementing IHCS.

## 3.1. Theories that Guide and Explain Implementation of IHCS

### *3.1.1. Diffusion of Innovations*

The diffusion of innovations approach is perhaps the best known of the theories we consider. In his definitive book, revised in several editions over a span of decades, Rogers (1979, 1985, 1995) drew on such a rich and wide-ranging body of research on diffusion from widely varied settings and innovations. Within this approach, an "innovation" is very broadly conceived as an idea, process, or physical technology that is new or unfamiliar (or, more precisely, not being employed) within a particular area or social system. "Diffusion" refers to the manner in which an innovation permeates, or spreads, through an area or system, Rogers [1] defines "diffusion of innovation" as "the process by which an innovation is communicated through certain channels over time among the members of a social system." In its descriptions and explanations of diffusion, this approach fruitfully organizes insights around such things as stages of adoption, attributes of innovations and innovators, processes, social-structural constraints, and so on.

#### 3.1.1.1. Stages of Adoption

Adoption of an innovation is a complex interpersonal and intrapersonal process. Individuals progress through a decision-making process to adopt a new technology. The process can be described in five steps: knowledge (meaning awareness of the innovation and its function), persuasion, decision, implementation, and confirmation. That is, research on a wide variety of innovations has indicated that potential adopters usually first go through a period of becoming aware of the existence of the implementation (perhaps through accidental exposure to communication; perhaps through routine scanning based on topical interests and habits to certain channels of communication), and then learning about its attributes. Although the dividing line between the first two stages is somewhat fuzzy, persuasion will involve greater activity and involvement on the part of potential adopters. They acquire more detailed and evaluatively linked knowledge about the innovation, either independently (self-persuasion) or as a result of intentionally persuasive communication that provides such linkages. In addition, social norms (perceptions of others' beliefs and the degree to which these beliefs matter to the individual) may begin to play a role at this stage. As the decision-makers form these evaluations, they move into the decision stage, in which they consider whether or not to use the innovation.

After a decision to adopt, the implementation stage is no longer merely cognitive and affective, but involves actual behavior – putting the innovation into use. This will often introduce a whole new set of practical and operational issues. And as Rogers [1] points out, these become particularly important when the adopter is an organization rather than an individual, both because of the necessary coordination and because otherwise functional organizational structures may actually impede implementation. Even after an innovation is adopted, the initial and continuing experience with it (and others' reactions as well) provide for ongoing confirmation (or disconfirmation) of the implementation decision.

#### 3.1.1.2. Communication Channels

Communication channels assist in the diffusion of innovations by providing mechanisms for creating awareness and engendering influence. Although the relationship is not precise, different communication channels have been associated with the five stages of the adoption process. Mass communication messages dominate the early stages, especially *knowledge* but also *persuasion*. Interpersonal communication becomes more important during the *persuasion* and especially the *decision* stages. The *implementation* and *confirmation* stages are usually not strongly associated with any particular channels, probably because of the expectation that the adopter's own experiences will be primary here.

However, we would point out that both mass and interpersonal channels could contribute here as well, the former by providing outside evidence of success or failure, and the latter by assisting with evaluation of one's own evidence.

Judicious use of communication channels in the early stages of an adoption insures that information about the innovation is widely transmitted. In later stages, the communication channels convey messages about the experiences with the innovation. Systematic dissemination about an innovation contributes to its successful implementation.

#### 3.1.1.3. Innovation Characteristics

Rogers [1] asserts that every innovation can be described by five characteristics. These characteristics jointly and independently influence the probability of adoption, and subsequent implementation of an innovation. The first characteristic, *relative advantage*, refers to the benefits afforded by the innovation over continuing current practice. Second, *compatibility* reflects the degree the innovation "is perceived to be consistent with existing values, past experiences, and needs of potential adopters" [1]. In the case of IHCS, compatibility with both the health care system and the intended patients must be considered. *Complexity* signals how difficult the innovation is to understand and use, because the degree of effort required to adopt will implicitly be traded off against relative advantage, at the least. *Trialability* indicates whether the innovation can be adopted partially or tentatively, or whether one must instead make a substantial commitment of time and resources. Finally, *observability* refers to the degree to which benefits of the innovation are apparent, in terms of both concrete differences and immediacy.

#### 3.1.1.4. Innovator Characteristics

Deutschmann and Fals Borda [2] first proposed distinguishing adopters by their degree of innovativeness. Their conceptualization used the order or earliness of adoption to place individuals in five categories: Innovators (first 2.5 percent), early adopters (next 13.5 percent), early majority (next 34 percent, reaching the median), late majority (34 percent), and laggards (the final 16 percent, which may include some who never adopt, regardless of positive innovation characteristics). In later work, membership in these categories emerged as a function of time to adopt. Note the assumption that the innovation will be so attractive that essentially everyone should adopt, which is often not so clear-cut in reality.

Members of each category of adopters share common characteristics. As a group, innovators (or first adopters) seem motivated to be venturesome for its own sake, have the financial resources to absorb a loss, and the intellectual or educational resources to deal with complexity. Innovators may also be cosmopolite often to the point of not being well integrated into local social systems. Early adopters may also be above average in terms of education and financial resources. They tend to be more locally oriented than innovators, but more cosmopolite than later adopters. Their leadership is also much more important to later adopters. The early majority is characterized as "deliberate" in their decisions, while the late majority is “skeptical.” Laggards are often dismissed as either “traditional” or incapable of change for lack of resources.

Over the past several decades, research using the diffusion of innovations approach has been quite successful at analyzing successful and unsuccessful attempts at diffusion, and has regularly been used to advise campaigners and change agents about effective courses of action.

## *3.1.2. Organizational Change*

A second set of theories that illuminate the adoption of innovations anchors the focus on the systematic changes in an organization’s structure and/or functioning stimulated by adoption of an innovation. Organizational change theories seem clearly relevant to implementing IHCS within an organization, since adopting and utilizing the IHCS require changes of behavior by organization members and sub-units, and often also involve realignments of departmental and personnel responsibilities.

Various theories emphasize different factors that contribute to change in organizations. Goodman [3] identified factors that make change more likely, including top-management commitment, employees’ readiness for change, level of resistance, and organizational culture. Work in innovation adoption and diffusion identifies open communication, an interconnected organization, available resources, use of champions, understanding of user needs, management strength and authority, and marketing as key factors [1, 4, 5].

Other theories of organizational change describe the process by which change occurs. For example, Lewin’s [6] three stages of implementing change – unfreezing current practice or structure, moving to the changed state, and refreezing or solidifying the new state – has guided the development of many other theories and models of change. Kotter [7] elaborated on this with a larger number of steps, some of which also identify factors making change more likely: establishing a sense of urgency; the formation of a powerful team to guide the change; creating, communicating, and empowering others to act on a vision; and planning for and creating short-term wins.

One approach integrates elements from these diverse approaches into a single multi-factorial model to predict the probability of successful implementation of change [8]. A central tenet of this model is that innovations stimulate organizational change. Here the multi-factorial model and its elements are described in somewhat greater detail.

### 3.1.2.1. Readiness for Change

Organization members’ beliefs and attitudes about the need (“tension”) for change and the organization’s capacity to actually change constitute important capital in the change process [9]. Thus, strategies to increase or influence readiness generally include persuasive communication, particularly focusing on creating awareness of a discrepancy between current and desirable states and also emphasizing the ability to change [10, 11]. However, readiness (as well as "resistance," below) is grounded in the organization's experiences with previous organizational change attempts, as well as the organization's history in general. In addition, the technical capabilities of individuals and key target groups within the organization will shape the ability of the organization to actually change [12], as will self-efficacy and providing incentives [13].

#### 3.1.2.2. Resistance to Change

Organization members may resist changes for many reasons. Resistance may stem from apathy, inertia, fear of being displaced, or generalized distrust and hostility toward the organization [14], and in other cases from simple ignorance of the benefits of change. Resistance in these cases may be mitigated through more effective communication [7]. However, one must recognize that some resistance may be informed and rational, as when there are thoughtful disagreements about the best course of action or when different individuals or sub-units have conflicting interests, and some resistance may simply be an inevitable response to any change [15].

#### 3.1.2.3. Characteristics of the Proposed Change

As with Roger's [1] diffusion of innovations model, this multi-factorial approach also identifies characteristics of the innovation that make adoption and implementation more or less likely: simplicity, testability, modifiability, compatibility with existing practice and relative advantage.

Note that the multi-factorial organizational change model elements summarized so far are all essentially characteristics of individuals or of the change (or innovation) itself. In this focus on the individual or micro-level, the multi-factorial model is so far not so different from the diffusion of innovations approach. However, what is significantly different is that this approach explicitly incorporates elements that are at a higher level of aggregation, the organization itself. These elements arise from the organization or its sub-units and not of individuals within the organization. In addition, the multi-factorial model also employs elements that, while being characteristics of individuals, are important because of the manner in which they exert influence on the organization (e.g., see "champions" below).

#### 3.1.2.4. Organizational Environment

The degree of formality, complexity, size, and centralization of the organization's current structure all affect the likelihood of successful change, although often in complex and varied ways. For example, formality can produce rigidity and thus resistance to change, but the clear relationships and responsibilities spelled out by a formal organization can also speed change recognized as legitimate. Beyond this, the recent and current degree of turbulence or stress within the organization and its immediate environment of clients, suppliers, and competitors may impede the organization's ability to focus on the innovation.

#### 3.1.2.5. Champions

Champions are organizational members who guide an organization through the change process stimulated by the adoption of an innovation. Change is facilitated by the presence, visibility, and continued energy of highly placed champions within the organization. It is important to emphasize both the noun and the verb form of this word, because both the person and the action are seen to matter enormously. A champion needs to be a person with visibility and prestige within the organization [4], but also needs to be persistent, enthusiastic, and persuasive in advocating for the change [16, 17]. Since champions are of course themselves individuals, it may seem odd that we place this factor with organizational characteristics. But as a force to promote organizational change, the prestige and activity of the champion act as characteristics of the organization rather than of an individual. That is, the champion's behavior provides a motivating "push" to many or all of the individuals within the organization, and that "push" is thus for them a characteristic of their organizational environment.

#### 3.1.2.6. Opinion Leaders

A closely related concept is that of opinion leadership, or the idea that some individuals influence others' beliefs and actions. This influence stems either (or both) from expertise or from representativeness [18]. Like champions, opinion leaders have influence precisely because of their organizational image.

### *3.1.3. Implementation Theories*

Theories of implementation are concerned with the additional complexities that emerge when organizations institute change and adopt innovations. A number of loosely related studies and theoretical approaches have focused on this phase. For example, research suggests that if the organization has involved the staff in the decision to adopt, the change – or technology – is more likely to be accepted [19]. Also, organizations that encourage a climate for creativity [20] push decisions down to lower levels of management [19], foster an open and cooperative atmosphere where staff are treated as valued resources [21], and where staff perceive their goals are congruent with organizational goals [22, 23] tend to be more successful in adopting new innovations.

A second key set of understandings here has to do with distinguishing stages within implementation. That is, where the diffusion of innovations approach notes a number of steps that generally come before implementation (i.e., knowledge, persuasion, decision), implementation theories telescope these three into an initial decision stage, and then distinguishes (1) a formal introduction of the change to the organization, (2) an initialization stage to expose and train members, (3) early experiences (including feedback and corrections), and (4) institutionalization of the change. Van de Ven et al. [24] argue for a dynamic and iterative model in which intra-organizational politics and negotiations often lead to a back-and-forth movement between these stages. Further, Zmud's implementation process theory [25] argues that individuals' attitudes and beliefs (or attributes of the innovation itself) matter far less than organizational encouragement, coercion, resource support, and incentives, and so on.

## 3.2. Applying These Theories to IHCS Implementation in Health Care Organizations

With this overview of three theoretical approaches behind us, it is now worthwhile to consider their relative merits for guiding the implementation of IHCS. Each has relevance, yet each also has limitations that introduce caveats or force us to simultaneously draw from one or more of the others as well.

At first glance, Rogers' diffusion of innovations appears very relevant and applicable. The IHCS described in this text represent novel applications of information technologies to health care. They were certainly innovations to these organizations and were regarded as such by participant members of the organizations. However, several caveats limit the relevance of the approach. First of all, the diffusion of innovations approach tends to focus on the *adoption* process – how an innovation comes to be recognized, understood, considered, and then acted upon with a change in behavior. These steps are important here, but it will be readily apparent from the case studies that adoption is often merely a simple precursor to what is actually problematic. Adoption by an organization often seems to be an individual or small-group decision, for which the diffusion of innovations approach is certainly applicable. But this initial decision, as argued by various implementation theories, merely begins a much more complex and multi-faceted set of processes involving far more actors and levels of analysis. It is this complex and multi-faceted process that forms the focus of the case studies presented in this book.

A related point is that the individual level tends to be the focus on the diffusion paradigm, whereas implementation of IHCS requires *organizational* investment. At the least, we must talk about many individuals whose efforts add up to implementation. More realistically, their actions sometimes compete or interfere with each other, or the impact of one person's actions is contingent on something another does or does not do. Beyond this, it is inescapable that implementation of IHCS in organizations also requires considerable (and perhaps predominant) attention to processes that are themselves at organizational levels of analysis rather than individual ones. Research in the diffusion of innovations is not blind to these issues, of course, but the focus is both on what leads to initial adoption decisions and on individuals.

Nevertheless, some distinctions and concepts from the diffusion approach remain highly useful here, particularly characteristics of innovations (e.g., simplicity, trialability, etc.), because the IHCS itself is a complex but discrete innovation.

The organizational change models, with their emphasis on necessary conditions and strategies for an organization to change its structures and processes, also offers guidance to IHCS implementation. However, it too is probably of limited utility to describe how organizations adopt and implement IHCS. The main problem here is that the IHCS under consideration are small additions or side issues for the organizations involved. Rather than representing fundamental changes in business practices, these IHCS add to the portfolio of clinical therapeutics and pose little demand for core structural or functional change. The organization that adopts them typically maintains its current structure – even if that structure is not optimal for the IHCS concerned. Therefore, concepts like the stages of change for an entire organization hold little relevance. Nonetheless, its concepts of readiness, resistance, organizational climate, and champions will all be useful here.

The implementation theories thus seem to come closest to representing what we have set out to understand. In many of the case studies in this book, the IHCS was not central to the organization. The addition of an IHCS to an organization's options is an add-on – a new thing to do or a new way of doing one of many things already undertaken. Furthermore, the emphasis on organizational-level processes and iterative tuning seems to reflect things that the case studies called out.

Still, each of the models has things to contribute. Thus, the model development outlined in Chapter 5 and the analyses of individual cases that follow draw on elements from each of the three theoretical approaches.

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# 4

# Considerations for Successful Implementation of Newly Adopted Technologies

David H. Gustafson and John Fellows

In the previous chapter we described three sets of theories (Diffusion of Innovation, Organizational Change, and Implementation theories) that provide the groundwork for the introduction of IHCS to health and social service organizations. This chapter focuses on the practical advice and strategies that arise from these theories.

Successful IHCS implementation is a complex process that requires careful planning and execution. No single theory is sufficiently robust to guide such a complex process. The *Diffusion of Innovation* theory offers understanding of these characteristics, including the nature of technology itself, how the technology meets user needs, and ways it should be promoted. Other characteristics found in the process of implementing newly adopted technologies pertain to the organization itself, its motivations, environment, and readiness to change; here the *Organizational Change* theories have most to offer. The last set of characteristics is concerned with the logistics of bringing a new technology into use; here the *Implementation* process theories provide guidance. Grounding implementation of IHCS in concepts drawn from these three sets of theories is aided by the wisdom of Nadler [1] and Deming [2], who assert that the implementation of newly adopted technologies requires attention to the technology itself, the customer needs intended to be met by the technology, and the ways in which information about the technology is promulgated.

Drawing knowledge from all three theories results in a more tailored picture of the IHCS implementation and its effects on an organization. We describe some of the practical considerations of implementing IHCS in this chapter, and integrate selected concepts from the theories presented in the previous chapter as a foundation for the implementation model detailed in the next chapter of this book.

## 4.1. Diffusion of Innovation Theory: Characterizing IHCS and Key Participants

The diffusion of innovation theory focuses on the innovation (i.e., IHCS) from the perspective of the key participants in the adoption process. An innovation is perceived useful if it meets the needs of a special user group. The process characteristics that draw from innovation diffusion theory include characteristics of the technology itself, the ability of an innovation to meet user needs, and the promotion and communication channels used to communicate experience with the innovation.

### *4.1.1. Characteristics of the Technology*

Interactive health communication systems are specialized computer programs designed to provide health promotion and disease management support and instruction directly to patients. While their primary focus is on serving consumers, they also allow health care professionals new opportunities to design prevention programs and coordinate care. IHCS applications operate through telephones, palm devices, Internet appliances, personal computers, and public kiosks, as well as tailored print communications that have been generated by computer-based algorithms.

These innovations may be developed by specialty research practice groups (as in the cases presented here), purchased off the shelf by an institution, or managed as a contracted service. In the examples explored in this book, a close relationship existed between the developer of the IHCS and the institutions adopting the innovation. In more mature technologies, the developer role is less obvious and palpable to the groups adopting the innovation.

Many IHCS provide some type of health information, and sets of tools that promote communication among intended users and between the patients and their care providers. In addition to the considerations noted by Rogers [3], such as *trialability*, *observability*, *relative advantage*, *compatibility*, and *complexity*, other characteristics of the technology that influence its implementation are the quality of its content, the cost of acquiring the technology, and the availability of assistance for users. In essence, the technology innovation must meet user needs.

Note that our definition of an IHCS does not include electronic medical records. As such, IHCS face a systemic problem; they are perceived as peripheral to the main tasks of medicine. As such the adoption and implementation of IHCS through health care organizations faces an inevitable hurdle of needing to market to non-users who are not convinced that the end-users actually need IHCS as much as they need traditional health care.

### *4.1.2. Meeting User Needs*

Any organization implementing an IHCS must attend to the needs of clinical staff, who will have to advocate for the IHCS, and the patients and their families, who will be the actual users of the IHCS. While the clinical staff has many needs, a critical one as far as IHCS goes is the very busy schedule they operate under. IHCS that make their work life easier or allow them to do a better job will be more readily accepted. IHCS must be relevant to the care and coping needs of individuals, available and affordable to them, and be sufficiently easy to use.

During implementation a health care organization needs to see its customers as including family and informal caregivers, as well as patients. It is important to understand how to create (and effectively disseminate) messages in ways that address familial needs and respect differences in family communication and decision-making styles. Cultural sensitivity may be important in one instance, and less so in another. A person facing a life-threatening illness, for instance, may be less concerned about issues of cultural sensitivity than a person who is the target of a primary prevention program. On the other hand, certain strategies for coping with life-threatening illness (e.g., computer-based cognitive behavior therapy) may assume a need (e.g., for autonomy) that may be inappropriate in some cultures where “I” statements are not valued.

In a similar view while cultural issues are beginning to influence IHCS design, they are not having the effect they deserve on how best to implement these systems. It would be a mistake to assume one approach can be used to implement IHCS in organizations staffed primarily by African-Americans or by Asian and Pacific Islanders, Hispanics, and Native-Americans. For instance, one culture may want to have very specific guidance on how to implement an IHCS while another may value choices. Clearly, there are important cultural differences to consider when offering an IHCS to diverse populations. For instance, a Native-American program may want to link the IHCS with a medicine wheel and determine whether discussion groups should be modified to fit more closely with principles of the talking circle. But what key aspects of an implementation strategy need to be tailored for each population? Should the target of implementation always be the patient, or in some cultures should it be the adult child who uses the system on the patient’s behalf and therefore needs the training? What is the best way to introduce different cultures to the concept and potential of an IHCS in order for them to be willing to use it? How do issues of timing influence different cultures? Will some be more or less open to using it soon after the diagnosis? We have a long way to go on these issues.

### *4.1.3. Promotion*

A key issue in successful implementation of any technology and certainly for implementation of IHCS is the quality of efforts to promote it. One key issue here is whether there exist champions at both the corporate and departmental levels that have irresistible influence among people whose support is needed for the implementation to succeed and for the program to be sustained. These champions not only need to be influential but also willing to go out of their way to remove barriers to implementation and to actively push the short-term and long-term success of the effort. A key risk here is that key players in the organization may actively champion the technology at the beginning but then move to other important issues later on. The people leading the implementation effort should keep the champions motivated to continue their support, and also need to engage in succession planning, to think through how they will deal with a transition if the champion leaves or moves on to other issues. A constant effort must be in place to grow and develop new champions.

A second key issue is the quality and sustainability of the promotional efforts. One of the important elements to successfully implementing and sustaining change is to have an effective strategy for communicating the intent, design, testing, and implementation of the technology. When key people feel informed they are much more likely to support the change. Hence, the key elements of a communications plan need to be developed before implementing the new technology. The development of this plan should focus on identifying (1) the audience, (2) the objectives, (3) the message, and (4) the means of delivering the message.

## 4.2. Organizational Change Theory

The organizational change theories characterize institutions, their readiness or resistance to change, and the context of the organization, including the organizational environment and the key actors. Specific characteristics in the implementation process that draw from the organizational change theories include the organizational environment itself, organizational motivation, the degree of awareness and support the change has within the organization.

### *4.2.1. Organizational Environment*

#### 4.2.1.1. The External Environment

The external environment of an organization (marketplace, industry, as well as geographic location) exerts influence on the ultimate success of the implementation. While organizations have little control over their external environment, they are nonetheless subject to selected influences from these sectors. For instance, federal policy toward IHCS will influence what funding is available and what stance health plans take on reimbursing the costs of IHCS operation. While the organization may not be able to control those outside characteristics, it can plan on how to take advantage of them or how to ameliorate their effects. What are those conditions in the environment that may affect IHCS and how should they be dealt with?

While consumers are direct beneficiaries of IHCS, the societal values, roles, and beliefs about consumerism exists as an external force on the organization. When a person suffers an illness or injury, it can have far-reaching effects on patients and their families in such areas as productivity, self-esteem, and functionality. Unnecessary relapses and re-admissions, and illness-related depression also have an affect on the families. At one time, health care providers were able to approach illness and injury from a broader perspective than they can today and thus help minimize the total burden of illness. As care became more specialized, however, and financing pressures focused care on more technical issues, reducing the "total burden of illness" became less of a priority to health care providers [4].

In part, those pressures exist because we have not only the most expensive health system in the world, but also one that is less effective than systems costing much less. Hence US producers find themselves at a competitive disadvantage compared to similar producers elsewhere. As a result, they exert pressure on health plans to reduce or at least contain costs. While such actions may be shortsighted they are certainly understandable. But the pressures to be more productive are also internal. Many health systems are losing money. Expenditures for pharmaceuticals have increased dramatically. Costs need to be contained, and narrowing the focus of care is one key way of doing it.

Partly as a result of this narrowing of focus, many consumers are becoming more assertive regarding their health and health care. They want to improve their health behaviors. They want access to their medical records, specific answers to their questions, a greater role in treatment decision-making and more convenience (e.g., access without appointments, e-mail communication with their physicians). This trend, of course, is supportive of efforts to implement IHCS.

Concurrently, pressures to reform are growing. Some accreditation groups such as the Joint Commission on Accreditation of Healthcare Organizations require that patients be educated about their illnesses in a consistent way [5]. Patient safety, quality improvement, patient rights, and an increasing focus on primary and secondary prevention are forcing health care providers to carefully examine how health care is practiced and to consider how and what to change. In some cases, the pressures to change are coming from the increasing perceived legitimacy of complimentary medicine. Providers such as chiropractors, acupuncturists, and massage therapists are increasingly accepted as credible alternatives to allopathic medicine. In fact, some health care provider organizations and Health Maintenance Organizations (HMOs) are adding such services to their program offerings in response to rising consumer demand. This has important implications for IHCS content, design, and implementation.

Some employer health care coalitions are beginning to accept that indirect costs of illness and injury far exceed the direct medical costs. In response, they are becoming more involved in programs to help employees and retirees prevent illness or speed recovery from it. Some schools are beginning to recognize that they can influence student health and well-being through more aggressive prevention programs and through collaboration with health care providers to reduce the severity of illnesses. While employers recognize the need for change in those areas they are also seeking a cost-effective means for accomplishing these goals. This creates a potentially important and welcoming event for IHCS.

As services become integrated across institutions and across providers, the need to share health information and effectively coordinate interventions and care becomes more important. There will be little benefit to working at cross-purposes.

Health care providers need to know what other providers are doing and how consumers are responding to the interventions they receive. Consumers need ways to help themselves improve their health and health care. Such sharing, while impractical a few years ago, is practical now because of the increasing capability of the Internet and related telemedicine efforts.

### *4.2.2. Organizational Motivation*

The internal environment of an organization consists of the physical structure, the roles necessary to accomplish the work of the organization, and various cultural aspects including communication pathways, formalization of decision-making, and resilience. These aspects are manifested in many ways; their importance to implementation rests in their contribution to creating an organizational motivation to manage the process of implementing newly adopted technologies.

Implementers need to examine the organizations' goals and determine their alignment with the purpose and goals of the IHCS before beginning implementation. Many failed implementations have occurred because an organization thinks the technology is a good idea but has not clearly understood what role the technology would play in the organization. How will it help to achieve key organizational goals? What will it do, what it would not be able to do? How can the ICHS be adapted to more effectively help achieve those organizational goals?

There are many challenges associated with implementing IHCS, but the effort may be worthwhile because of the potential benefits. IHCS have the potential to extend resources by substituting for professionals (e.g., doctors, nurse, social workers, and nutritionists) in activities that currently take their time but do not require their skills. For example, mental health professionals could spend more time on therapy if IHCS were used to educate patients about their illness, schedule appointments, collect baseline data, explain depression, help patients visualize treatment strategies they will encounter, and order prescription refills.

These tasks might actually be performed more effectively by IHCS because they can be done at the convenience, location, speed, and depth the patients prefer. By becoming more informed about their disease and treatments, patients may ask providers more informed questions, manage their diseases more effectively, and even monitor and intervene to improve the quality of their own care. Which of these and other benefits does the organization hope to accrue by implementing an IHCS?

### *4.2.3. Awareness and Support*

Organizational change requires awareness and support of the innovation and its intended contribution to the organization's mission. Some personnel need to be involved in the operation of the IHCS; others may not play a direct role in its operation but will be affected by its presence. For instance, a physician may not play a central role in getting patients to use it, but an IHCS may lead the patients and their families to behave differently in an office visit, or in how they make health-related behavior changes. In any case, staff will need to be aware of the program and its implications. Their support will be needed for its success. In order to implement a new technology, physicians and other health care providers are being asked to change their behavior (e.g., by remembering to refer a patient to the technology) at a time when they are under pressure to spend less time with their patients.

Simply asking physicians to tell patients to use an IHCS places physicians in a new pattern of behavior they may not be able to adopt. Simply put, they forget. Nurses are another referral source. But again expecting them to change their behavior, especially if they do not believe in the system, may be asking too much. A third option may be to have the patient educator introduce the IHCS to the patient. But how do they identify the patient in an efficient and timely manner?

To get clinicians to encourage patients to use an IHCS, it is necessary to integrate IHCS into the delivery process. Currently many IHCS are independent of health care delivery and sometimes seen by clinicians as add-ons that cost money and time. If these systems can lead to dramatic improvements in outcomes or substantial reductions in clinician workload, then organizational and individual acceptance will be substantially enhanced. Existing institutional members, including the medical director, head of information services, and the patient care leadership, serve an important, enabling role in the implementation process. Effective encouragement comes from the active, verbal, public support of institutional opinion leaders and innovation champions.

All of this implies that providers must do something in order for an IHCS to be implemented. It adds work. But earlier we noted that a key element of success would be to make a provider's job easier or more rewarding through the use of an IHCS. It may be possible to automate the process of introducing the IHCS or call upon volunteers who have used and benefited from the IHCS in the past. Alternatively, if the IHCS clearly improves the patient outcomes or makes the family caregiving more effective, the provider may conclude that the added work of introducing and advocating for the IHCS is well worth the effort.

Several questions are important, and guidance exists regarding how to manage them. Which health care staff will be affected by an IHCS and how are they likely to be affected? How should they be addressed to insure that they are supportive of the system? What people are needed to operate the system? What roles do they have? Have job descriptions and reporting relationships been modified? What training do they require and what incentives to support IHCS can be offered? Is there a vocal and trusted opinion leader who can help carry the message to the professional staff? Conversely, is there a powerful opinion leader whose lack of support must be managed for the good of the project?

## 4.3. Implementation Theories

Implementation theories describe a phased approach to gaining full value from newly adopted innovations. They address the implementation process itself and include consideration of the extent to which an innovation fits with the resources and practices of the department, as well as the infrastructure needed to sustain and improve the content, structure, and use of the IHCS.

### *4.3.1. Implementation*

A prime consideration during implementation is what processes need to be in place in order for the IHCS to be effectively implemented within and outside the walls of the health care organization. Establishing an implementation coordinator role and vesting adequate authority and resources in it forms a success-inducing foundation for implementation. A process is needed to identify patients who would be good candidates to use the system. Another is needed to get them to use the system. Another is needed to support the ongoing operation of the system. Organizations need to identify these processes and specify how they should operate. Mechanisms should then be put in place to monitor how well the processes are working and to identify problems that arise or are likely to arise so they can be solved.

### *4.3.2. Information*

A key issue that deserves special mention is the information required to operate an IHCS once it is implemented. The organization will require information to effectively deliver the IHCS, for example information on how the system is used, the effect it has on the patient, and the effect it has on the health care organization. For example, one might need to know the number of patients who have used the system, what their reactions were to the system and how often they used it. This information could be provided to the physicians to gain their acceptance and support. Organizations need to think through what information needs to be conveyed to their staff and plan how to collect, analyze, and deliver it. Other information will need to be disseminated rather than collected. Internal and external customers need to learn about the IHCS and how to use it. Policies need to be written and promulgated.

Information will also be needed to make decisions about sustaining and spreading the use of an IHCS throughout the organization. While IHCS have tremendous potential for reducing utilization of health care, evidence of which is beginning to surface in research studies, it does not mean that results of controlled research will carry over to real-world implementation. The issue of cost effectiveness in the real world has been under-attended. This is a very important issue to any health care organization considering their adoption. A business case must be made for their use or IHCS will continue to be a fad. For instance, certain IHCS services can be labor intensive – such as facilitating discussion groups, answering questions to experts, supporting chat groups with experts, and establishing patient physician email. These issues are beginning to be addressed not only in the design of the IHCS itself but also in the design of benefits for health plans. With the recent recognition of the potential value of the personal health record, there is reason for optimism that there will be a very strong business case for an IHCS.

The cost effectiveness of an IHCS will be strongly influenced by the processes used to deliver it. A key consideration here is the way in which existing systems are used to disseminate the IHCS. Integration of IHCS into existing systems will increase the likelihood that they will be effectively disseminated because they simplify the dissemination process. But, how will the costs of operating and maintaining the IHCS be documented and how will these data be used to help make decisions about sustaining and spreading it? What information will be needed and how will it be used?

The IHCS will be at their best when they are delivered to users both inside and outside the walls of the organization. Hence an important issue related to cost effectiveness is what kinds of IHCS can function effectively in community-based "tele-centers" or "cyber-cafes." Current evidence suggests that home-based programs are needed at least to support people who are diagnosed with a life-threatening illness or injury so that they can get the information and support when they most need it and with great convenience. Because it is much more difficult to capture and maintain interest in chronic diseases over a long time, the convenience of a home-based system could be as important in promoting behavior change and disease management as it is to coping with more acute, life-threatening illnesses.

### *4.3.3. Evaluation*

Finally, implementation requires that we specify what effects the IHCS are expected to have on the different customer needs and the needs of the organization at a broader level. This raises issues such as how the impact of the IHCS on these needs will be measured and communicated, how the results will be used to make decisions about sustaining and spreading the IHCS, and what processes will be put in place to assist in making those decisions?

### *4.3.4. Departmental Fit*

An IHCS, like any other technological innovation, will require facilities and equipment (beyond the IHCS technology itself) to operate. The first choice the institution needs to consider is where the IHCS will be based organizationally. In doing so, it is desirable to insure the program is consistent with the services and procedures delivered by the department and to choose a department that has the prestige necessary to influence others in the organization to adopt the technology. But it also needs to consider what effect placement in that department will have on the workload and attitudes of staff.

Technical decisions that must be considered include what computer and telecom resources are needed to support the IHCS (server, secure network, and interface issues), where the server supporting the IHCS will be housed and what kind of software is needed to support the system. It is also the purview of the organization to consider how patients and their families will access the IHCS either at the clinic or at home. While some patients may use their own computers, in some cases (as IHCS become more effective) it may be cost effective to provide a computer to the patient and his or her family. Issues of connectivity via dial-up versus high-speed Internet access also need to be addressed.

The rest of this book will build upon the characteristics described above to produce a specific model to improve IHCS implementation effectiveness. The characteristics will be tailored to the unique features of IHCS implementation, and a method we developed for quantifying performance on these characteristics will be described. Finally, several case studies of the application of this model will be presented.

As IHCS implementation in the early-twenty first century remains in the exploratory and experimental phase, it is useful to think about planned experiments and research approaches to implementation. As novel approaches to work once done by clinical and professional staff, the introduction of IHCS generates new questions about work, workflow and the nature of clinical care. Under such thinking, the deployment of IHCS becomes an experiment in the facility – one that generates necessary information for consideration of further implementation and deployment in anticipation of full-scale integration with work flows.

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# 5
# Implementation Model Development and Testing

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This chapter provides a context for considering implementation of an IHCS in complex organizations, details those processes required to transform the concepts advanced in the theory chapter (Chapter 3), and applies the implementation process described in Chapter 4 into a practical index (called the Readiness for Implementation Scale – RIS) to evaluate and monitor an institution's potential for successful implementation of an IHCS.

## 5.1. The IHCS Implementation Context

The relationship between the developer, the implementer, and the end-user of an IHCS required viewing the relationships in a non-traditional way. While such technologies are implemented via an organizational entity (e.g., a cancer clinic), the end-user of the technology (the patient and his or her family) is not a traditional member (e.g., an "employee") of that organization, but rather a customer of the organization. Hence it was necessary to focus on a model of implementation in which a health care organization promotes the use of a particular IHCS to its patients and their families.

The new technology – the IHCS – is primarily used by the patient (or his or her family or friends) and is intended to positively affect the patient's health and well-being in many different ways. In addition, the IHCS is intended to affect the nature of the patient–provider relationship. While the technology can be physically located within the organization, it is not always the case. In fact, many IHCS expect the technology to be accessed from the patient's home, or sometimes from a different location, for example a public library or cybercafe.

This book is concerned with organizational adoption and implementation of IHCS. Supported by a grant from the Agency for Healthcare Policy and Research, the research team created a model to guide the implementation of IHCS. The model identifies a core set of elements that can predict and explain how to get an IHCS from the developer, through the health care provider organization, into the hands of the patients and their families who should use it.

## 5.2. Creating Models of Implementation

### 5.2.1. Why Model Implementation?

Models are formal tools that help individuals analyze complex situations, explain how various dimensions of those complex situations contribute to observed outcomes, and predict what might happen if particular changes were made. Models aid human judgment, because they provide order and organization to complex situations. Models come in many forms: physical models, drawings, and mathematical equations. In the case of IHCS, mathematical models of implementation provide a computational approach to understanding how the various components that contribute to the success of an IHCS work together.

Developing a model for implementation can be useful simply because it spells out which factors are important and how important each is. The model also advises on whether to, and how to, invest in improvement in each factor to maximize the benefit. The model also offers a way to score the likelihood of implementation success, which when applied periodically throughout the implementation process provides a quick means to track the progress of an implementation effort. This assumes that the model score is calculated at several points in time. It also gives one a way to scout out a potential implementation and decide whether the chances of success are worth the effort and what kinds of roadblocks are most likely to be harmful. Finally, one can use a model to simulate the implementation effort to determine how to best allocate limited implementation resources.

A model typically involves identifying a set of predictive factors, estimating their relative importance, finding a way to measure the factors on a common scale so that they can be combined, and (recognizing that performance on a factor may not be linearly related to the factor's contribution to success) understanding the relationship of the factor achievement to success.

When implementing a new technology into and through an organization, there are a number of factors that are likely to influence success. Some factors are more important than others. Given the complexity of an implementation process, the implementation team is unlikely to address every factor with the same intensity and success, and would wish to prioritize its efforts. Knowing the relative importance of these factors will help them do so.

The contribution of some implementation characteristics to the overall success of the IHCS may be summed up as "the more the better," but in many cases the relationship may be more curvilinear. For instance, additional experience of an implementation team may be important up to a point but then reaches an asymptote. In fact, more years of experience may, in some cases, actually reduce ability to implement because extensive experience may inhibit flexibility needed to adjust to changing conditions. Hence it is important for a team to understand at what point "investing" more in a factor does not bring commensurate returns.

### 5.2.2. Mathematical Models of Technology Implementation

For many years, several researchers have attempted to develop mathematical models of implementation. However, most of these have modeled the decision to adopt (usually defined as a new *product* purchase) rather than the process of implementing a technology within an organization, which is the focus of our work. The purpose of any mathematical model is to provide a quick and efficient way to evaluate complex things, like the implementation of IHCS. The models in essence take the place of an expert reviewer; good models produce essentially the same judgments that an expert would produce, had the expert actually evaluated the complex process. Thus, a model for predicting the implementation success of an IHCS should produce roughly the same prediction of success that an expert appraiser would produce, if the expert had conducted an on-site assessment. The benefit of the model is that it transfers the expert's appraisal into a workable set of evaluations and decision rules.

Many of the modeling efforts have been built around statistical decision theory. Statistical decision theory provides computational strategies for translating expert appraisal into numerical value [1]. Two other principles of decision science guide disaggregating complex situations into component parts (e.g., How much does the innovativeness of the corporate leader influence the likelihood that the new IHCS will be integrated into the organization?) and facilitating experts to make judgments about those more simple relationships: the impact that a single factor has on the chance of implementation. Then the model itself does the combining of these relationships. The approach assumes (unless special adaptations are made) that the component factors independently contribute to the final outcome.

To build the RIS model, we followed the same strategy used by Arkes and Hammond, 1986 [2], who used a regression model to link experts' judgments of profiles on hypothetical cases to an overall appraisal of the same cases. Experts then assign a goodness score to each profile that is regressed against the set of predictor variables used to describe the case.

The strategy we employed here is consistent with earlier work by our group. Over the last 20 years, as part of research efforts to improve long-term care quality [3], measure severity of illness [4], measure medical under-service [5], enhance quality improvement, and improve treatment compliance [6], our team had developed a variety of decision-science-based models to predict and explain change.

## 5.3. Development of a Model to Predict IHCS Implementation Success

### 5.3.1. Stage 1: Defining Success

Successful implementations of innovative technologies like IHCS have many indicators. It is important to note that the notion of "success" depends on the point at which success is appraised during implementation process. Success may also depend on the perspective used (individual versus organizational). In essence, success of an IHCS has two primary dimensions: the use of the technology and attitude toward the IHCS. From an *organizational* perspective, the success of the implementation might be measured both in terms of the number of providers (and proportion, i.e., the level of "penetration" of the technology in the organization) promoting the IHCS to their patients and in terms of their average attitude toward the technology. At the patient level – the ultimate goal of the implementation – similar measures can be formed by which actual use (extent and impact) and effect on the patient's (and family's) quality of life define the basis for success measures at both the individual and the organizational level.

Importantly, attitudes and support of management and other non-providers in the organization can be considered key in determining success. Even if the technology itself is ultimately abandoned, one might consider the experience of trying it out as a success if the organization changes as a result of the implementation. Furthermore, success can be defined differently for different organizations depending on their expectations and goals for the technology. For this reason, our definition of success from the provider perspective (use and attitude) was assessed with the following questions: (1) Is the technology still being used? (2) Are you glad the technology is available? (3) Did the technology work as it was supposed to? (4) Are you glad you tried the technology? (5) Has the technology become a routine part of your daily operations? (6) Has the technology been tried in other parts of the organization? (7) Overall, is the implementation of the technology considered (scale ranging from total failure to total success)? The answer to each of these questions provides a perspective on the extent to which the implementation of the IHCS would be considered successful; Question 1 addressing use and Questions 2–6 addressing attitude toward the technology.

## *5.3.2. Stage 2: Defining the Factors that Predict Success*

### 5.3.2.1. Expert-Panel Model Building

Mathematical models are built by identifying a set of factors, weighting their relative importance and combining them according to rules translating expert judgment into numerical scores. The objective of the models is to compute a single index number based on values for variables used to describe the phenomenon in question. To develop the models, a panel of experts was first asked to identify a set of variables that would be most useful for assessing the phenomenon if no other information were available. It is assumed that the variables selected are not necessarily equally useful as indicators, so the experts were asked to provide estimates of their relative usefulness.

If the variables were measured on different scales, the respondents were asked to convert all variable measurements to a common scale through a process called utility estimation. In making the utility estimates, the respondents considered characteristics of each variable that represent the most and least desirable points. A value of 100 was assigned to the most desirable level and a utility level of 0 was assigned to the least desirable level. Respondents were asked to establish intermediate values for the variables. A composite score was obtained by converting the raw values for each variable to a common scale by means of the utility data, weighting each value by the estimated relative usefulness of its variable, and adding the weighted scores for all variables.

A panel of six widely respected experts was selected to generate the model. The expert panel was chosen by a “snowball” nomination process, which began by identifying qualified nominators through the IHCS and change literature. Nominators were asked to nominate theoretical and practical experts for the panel. Individuals nominated by at least two people were considered experts and invited to participate. This development panel consisted of both theoretical and practical leaders in diffusion of innovations (Everett Rogers [7] [theoretician] and Vicki Friemuth [practitioner]) and management of technology (Andrew Van de Ven [theoretician]) as well as three other practitioners: Michele Phillips, Betta Owens, and Thomas Nolan, a respected organizational change consultant. Dr. Friemuth led CDC’s diffusion of innovation efforts while Ms. Phillips was the nurse manager in charge of implementing BabyCareLink, a computer-based system to support parents of children in neonatal intensive care units. Ms. Owens led the team that implemented CHESS in several clinical settings.

These experts, along with three others who did not attend the meeting, were interviewed individually to identify factors they believed important in predicting and explaining successful/sustained implementation of IHCS and ways of measuring each factor. To get them started in their thinking, they were also asked to discuss what “successful institutionalization” meant to them. This was done using individual telephone interviews. Specifically, they were to assume they were being asked to predict whether an IHCS being implemented in a health care organization would become a routine part of the organization’s operation. They were allowed to ask any questions they wished about the technology, the organization, the environment, and so on. After the experts identified a factor, they were asked to give examples of what responses regarding the factor would make them optimistic and what responses would make them pessimistic about implementation success. This provided clues for ways to measure the factors.

Interview results were compiled into a “straw model,” incorporating definitions of success, a list of factors, and ways to measure each of them. The resulting factors were combined across all interviews to create a non-duplicated set and placed into categories. Additional factors were then added from a search of the literature.

This straw model was presented at the beginning of a two-day, face-to-face meeting, involving Friemuth, Nolan, Owens, Phillips, Rogers, and Van de Ven. The first day began by discussing definitions of successful adoption, spread, and sustainability. The rest of the day was allocated to reach agreement on the factors and to discuss various strategies for measuring the factors. The second day was used to estimate utility weights on each of the remaining factors.

Next, an internal panel of experts was created – Patti Brennan, Ph.D., David Gustafson, Ph.D. (both systems engineers), Robert Hawkins, Ph.D.

(communications scientist), and Pauley Johnson Ph.D. (organizational change scientist) – all of whom had strong theoretical backgrounds in organizational change, decision theory, and medical informatics. Two people with practical experience in technology implementation (Susan Dinauer and Tracy Siegler) were also included. Using the external panel's results as the foundation, our internal panel of experts spent several months reviewing the concepts and eventually reaching consensus on a model framework that had a multi-level structure of categories and subcategories, which allowed the individual factors developed by the external panel to be placed into appropriate subcategories of the revised model framework, enhancing its theoretical basis.

As the internal panel of experts placed the model factors into the new framework, redundancies and other opportunities for combining and deleting factors were discovered, as were deficiencies where factors needed to be added. Changes were made with the goal of developing a set of mutually exclusive and exhaustive factors which impact the successful implementation of IHCS. The internal panel agreed on the redistribution, and this model became the a priori theoretical framework that would be compared to data collected from four separate CHESS implementation sites. In the process of making these modifications, the utility and factor importance estimates made by the external panel were no longer relevant because so many changes had been made.

### *5.3.3. Stage 3: Finalizing the Model*

After receiving the baseline data from the pilot test described above, the model continued to be refined, rearranged, and reworded through discussion within our internal expert panel. A final seven-factor model was achieved with each factor containing 5–7 elements (Table 5.1). A reliability analysis showed that each factor had a Cronbach's alpha ranging from 0.63 to 0.76. The 7 factors include

1. Organizational Environment
2. Organizational Motivation
3. Technology Usefulness
4. Promotion
5. Implementation Process
6. Department–Technology Fit
7. Key Personnel Awareness and Support.

Since each factor has 5–7 indicator elements a total of 42 elements resulted. The indicator elements serve as guides for assessment. To use the implementation model, one evaluates an implementation process on each of the indicator elements, assigns a value between 0 and 1 according to a set of phrases that match the process, and then creates a total summary score. Then summing the score, a value can be computed which represents progress toward implementation.

TABLE 5.1. Readiness for Implementation Model.

| | |
|---|---|
| **Organizational environment** | Organizational experience with innovation (Success, No experience, Mixed history of success and failure, Failure) |
| | Leader innovativeness (Innovative, Not innovative) |
| | Internal turbulence effect (Hinders innovative projects, Not distracting to innovative projects) |
| | Within-department cooperation (Cooperate, Little cooperation, Clash) |
| | Between-department cooperation (Cooperate, Little cooperation, Clash) |
| | Influence of external health care environment (Encourages adoption, Does not influence adoption, Discourages adoption) |
| **Organizational motivation** | Fit with key organizational goals (Helps to meet, No impact, Inhibits) |
| | The technology's ability to solve a key problem (Immediately obvious, Not immediately obvious) |
| | Costs and savings from the technology (Saves money, No information, Costs more money than it saves) |
| | Patients' expressed needs for the technology (Want its services, No evidence, Do not want its services) |
| | Corporate administrator support (Remove barriers, Take no strong position, Create barriers) |
| | Resources (Adequate, Inadequate) |
| **Technology usefulness** | Regularity of updates (Regularly updated, Out of date) |
| | Affordability (Affordable for patients, Not affordable for patients) |
| | Convenience of access (Convenient, Inconvenient) |
| | Ease for patients to find what they need (Easy, Difficult) |
| | Technical help for users and staff (Readily available, Not readily available) |
| | There is some indication that usage rates are (High, No information, Low) |
| **Promotion** | Promotion within the organization and to patients (Persistent, Little) |
| | Corporate champion existence (Push technology throughout the implementation, Push technology only initially, Do not exist) |
| | Corporate champion influence (Influential, Not very influential) |
| | Department champion existence (Push technology throughout the implementation, Push technology only initially, Do not exist) |
| | Department champion influence (Influential, Not very influential) |
| | Regular progress reports (Key persons receive reports, Key persons do not receive reports) |
| **Implementation process** | Technology in standard guidelines (Part of guidelines, Not part of guidelines) |
| | Customizability (Easy, Difficult) |
| | Processes to identify, refer, and support users (Effective, Ineffective) |
| | Implementation role training for staff (Trained, Not trained) |
| | Feedback is used to remove barriers and improve processes (Yes, No) |
| **Department–technology fit** | Home department (Well respected, Not respected, None established) |
| | Implementation started in unit where (Success is likely, Success is unlikely) |
| | Fit with other services/procedures (Easy, Difficult) |
| | Technical difficulties (Few, Many) |
| | Staff familiarity with the technology (Familiar, Unfamiliar) |
| | Effect on staff workload (Decreases, Does not change, Increases) |
| | Effect on care provider role (Clinicians see it enhancing, Clinicians do not see it threatening, Clinicians see it threatening) |
| **Key personnel awareness and support** | Key opinion leader support of the technology (Encourage use, Withhold judgment, Discourage use) |
| | Department manager support (Remove barriers, Take no strong position, Create barriers) |

*(Continued)*

Table 5.1. *(Continued)*

| | |
|---|---|
| | Key persons' understanding of implementation and use (Understand, Do not understand) |
| | Clinicians see their patients are (Benefiting from technology, Not affected by technology) |
| | Clinician advice for patients (Encourage use, Do not encourage use, Discourage use) |
| | Powerful skeptics (Concerns are addressed, Remain) |

### 5.3.4. Stage 4: Model Evaluation

We evaluated the Readiness for Implementation Scale (RIS) in two ways, following standard approaches to mathematical model evaluation. The goal of the evaluation is to demonstrate that the RIS model would produce the same assessment of the progress toward implementation that an expert would assign if the expert were to have conducted the assessment independently. First, we constructed 120 profiles of hypothetical IHCS implementation projects at various points of maturity (see Figure 5.1 for an example profile). We computed scores for these profiles using the RIS model and asked 410 specialists in patient care technologies to assign a score indicating the extent of implementation success for the profiles. We then followed the same procedure with profiles of 25 actual implementations, computing RIS scores at initial implementation, 6 months and 12 months after implementation, and then soliciting expert appraisal of the actual progress. The RIS score showed strong correlation with the expert-assigned scores in all cases, and therefore demonstrated that the RIS is a good substitute for expert appraisal of IHCS implementation success [8]. The next few pages present further information about the evaluation process for those who are interested in more details about this stage. You can also move ahead in this chapter to Section 5.4 describing the model factors that predict implementation success.

### 5.3.5. Development of an Evaluation Process

Once the factor structure and utility functions were agreed upon, it was necessary to develop and evaluate the two approaches to developing the implementation model – Multi-attribute Utility and Conjoint Analysis. A set of questions was developed that would be given to a large panel of experts to identify the factor weights and utility scores – key elements of a Multi-attribute Utility (MAU) model. A large set of profile scores was also needed to carry out regression analyses to calculate the weights for the Conjoint Analysis model. Specifically we needed estimates on enough profiles to insure that the key combinations of each set of factor levels were present. This required 820 profiles. In order to have each profile scored by at least 5 experts, a total of 410 experts was needed. Each expert rated 10 profiles. Hence, 4,100 profile scores of hypothetical implementation efforts were created.

Directions: Below is a description of a hypothetical organization in the initial stages of implementing a new technology. Please study it to get an overall feel for how the implementation is going. Then at the bottom of the page please rate the chances the technology will be successfully sustained after the initial implementation.

Because the profile is hypothetical, some details may seem a bit unrealistic to you, but please try to rate it anyway. If you have significant problems with any profile, please make a note of it on the bottom of the page.

**Organizational Environment** No organizational experience innovating. Leaders are innovative, but internal turbulence hinders innovative projects. There is little cooperation within or between departments, and the external healthcare environment does not influence adoption of the technology.

**Organizational Motivation** The technology helps to meet key organizational goals. The technology's ability to solve a key problem is immediately obvious. It saves money, and patients want the technology's services. Corporate administrators remove barriers to implementation, and resources are adequate.

**Technology Usefulness** The technology is out of date, not affordable, and inconvenient to access. It is difficult for patients to find what they need, and technical help for users and staff is not readily available. There is some indication that usage rates are low.

**Promotion** There is little promotion of the technology within the organization or to patients. No corporate or department champions for the technology exist. Key persons do not receive regular progress reports.

**Implementation Process** The technology is part of standard guidelines. It is easy to customize. Processes to identify, refer, and support users are effective. Staffs are trained in implementation roles, and feedback is used to remove barriers and improve processes.

FIGURE 5.1. A Sample Profile used in the Assessment

**Department-Technology Fit** No home department has been established for the technology, and the implementation is started in a unit where success is unlikely. The technology fits easily with other services/procedures, and there are few technical difficulties. Staff is familiar with the technology, it does not change their workload, and clinicians do not see it threatening their care provider role.

**Key Personnel Awareness and Support** Key opinion leaders withhold judgment about the technology, and department managers take no strong position on implementation. Key persons understand the technology's implementation and use.

Assessment: How likely is this organization to continue to use this technology after the initial implementation? _____% Chance

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Figure 5.1 *(Continued)*

Invitations (including an offer of $100 for those who participated) were sent to members of the American Medical Informatics Association and to the Society of Behavioral Medicine inviting them to participate in the evaluation if they fit into any of the following categories:

- Corporate-level executive who has been involved with approving an IHCS and/or securing resources for this type of project.
- Department manager who has had overall responsibility for implementing this kind of system.
- Champion of such a system who has pushed to have it implemented in a department or organization;
- Front-line staff person who has had some responsibility for implementing this kind of system.
- Academic or consultant who has studied or played a role in advising such implementations.

The experts were asked to rate the likelihood of implementation success for each of the 10 profiles they were given (Figure 5.1). The resulting 4,100 scores were regressed against the levels of the factors in the model to estimate the parameters for the Conjoint Analysis model. The 410 experts were also asked to assign importance, weights, and utility scores to each factor and their levels. These scores allowed for the calculation of the MAU model weights and utilities.

Experts were invited to participate in different waves of mailings. The number of experts sent out packets each time varied depending on the response from the previous mailing. Once responses to the first wave were received, it was known which profiles still needed to have duplicate scores assigned. Then another wave of invitations was sent out with the appropriate profiles included. In total, 33 waves were employed to finally obtain responses from 410 experts resulting in an overall response rate of 28 percent to all the mailings.

As a result of the work described above, a complete MAU model (including weights and utilities) was generated and was ready for testing; and the materials were ready to generate the Conjoint Analysis model. The next steps involved: (1) calculating the parameters for the Conjoint Analysis model, (2) preliminarily evaluating the model's correlation and predictive performance using profiles of hypothetical implementations rated by the 410-person validation panel, and (3) conducting an in-depth evaluation of 25 real technology adoption situations.

### *5.3.6. Hypothetical Evaluation*

As mentioned earlier, the expert panel was presented a set of 820 hypothetical profiles built on the factors identified in the model. One-hundred-and-twenty profiles were withdrawn from the test bed before developing the Conjoint Analysis model. Three scores were calculated for each of the profiles: (1) the average score assigned to the profiles by the experts, (2) the score assigned by the Conjoint Analysis model, and (3) the score assigned by the MAU model. These profiles were used to test the Conjoint Analysis and MAU models. Then the relationship between the profile average score assigned by experts and the score computed by the Conjoint Analysis model and the MAU model was examined. The performance of the Conjoint Analysis and MAU models (in terms of how well they predict the average scores provided by the 410 expert panels) was investigated by several regression analyses.

### *5.3.7. Field Evaluation*

While the performance of the models on hypothetical profiles was impressive, such an approach has limitations. First, the only information the panel is given is the information defined by the factors in the model. While the models were carefully developed, they may be incomplete. Second, the models are hypothetical and thus may present information in a format that feels unwieldy and unrealistic. The amount of information provided in a profile is extensive and the experts may not be able to accurately combine it all into a judgment. Hence the evaluation is not as informative as one that uses real cases.

This final evaluation involved testing the model on 25 prospective implementations of an IHCS. While all the case studies described in this book focus on CHESS, other IHCS were used in this final model evaluation. Each of the technologies provided one or more of the following features for patients/members of health care organizations: (1) health information, (2) tailoring, (3) ability to send messages to/from provider, (4) other medical advice, (5) an electronic medical record, (6) interaction with other organization systems, and (7) social support. To the extent that CHESS is a special case of IHCS, the case studies have only limited generalizability. In order to insure that a range of IHCS were involved in final evaluation, only two of the 25 involved a CHESS implementation. This test was less a set of case studies of implementation; rather it served as an application to see how well the model predicted implementation success. The model was tested prospectively in 15 different organizations for a total of 25 implementation sites (implementation sites were sometimes in different parts of the same organization). Each site was in the initial phase of adopting a new IHCS when the first data was collected.

Key informants were surveyed about all variables that defined the final model at three times (0, 6, and 12 months) during their implementation to observe changes over time. Time 0 was defined as the point at which a formal decision to adopt the IHCS is made. In addition to the questions needed to generate a prediction, survey questions about the status of the outcomes of the implementation were also included on the 6- and 12-months surveys.

1. Is (the IHCS) still being used?
2. Did (the IHCS) work as it was supposed to?
3. Are you glad (the IHCS) is available?
4. Are you glad you tried (the IHCS)?
5. Has (the IHCS) become a routine part of your daily operations?
6. Has (the IHCS) been tried in other parts of the organization?
7. Overall the implementation of (the IHCS) is considered (check one):

___a total failure
___a failure
___more of a failure than a success
___more of a success than a failure
___a success
___a total success

As a result of this data collection, data on outcomes at two points in time (6 and 12 months) and prediction-of-success scores at 0, 6, and 12 months are available. Hence three prediction/outcome pairs per implementation have been captured: prediction at start versus outcome at 6 and 12 months; prediction at 6 months versus outcome at 12 months. The model "prediction" at 6 months to outcome at 6 months was also compared. The more proximate the measure, the more accurate the model was expected to be, but there was also interest in the long-term predictive power of the model. The data generated thus allowed for the examination of specificity and sensitivity of the model to predict implementation success. While a much larger data set would be required to fully establish predictive validity of the model, it is believed that these data suggest the model's potential usefulness in guiding implementations.

The model factors represent structural and process factors for the health care provider, the IHCS, and the patient. These concurrent measures were used as a measure of implementation success and thus used to examine

- Relationships between predictions and outcome as a means of validating the model.
- Changes in factor scores over time. They provided insight into what kind of interventions might be employed in other settings to enhance success potential.
- Trends in outcomes over time; relating them to changes in factor scores as a means of further enhancing the predictive model.

### *5.3.8. Model Performance*

The model performance continued to be quite impressive. Out of 820 profiles, 700 were randomly selected to develop the model with 120 hold-out profiles. A 0.78 R-square indicates adequate model fit of the Conjoint Analysis. In the profile scores, 78 percent of the variance can be predicted by the factor levels while the MAU model explained 71 percent of the variance. With the 120 hold-out profiles, the Conjoint Analysis model continually performs over the MAU model. However, when predicting the 25 field real cases, both models have similar performance with the MAU model performing slightly better as shown in the comparison Table 5.2. By comparison, most models developed for other applications have explained about 55 percent of the variance. Hence, both models are well established even though the results are mixed.

## 5.4. Factors of a Model to Predict IHCS Implementation Success

characteristics of the *organizational environment* that can determine readiness to adopt a consumer health innovation include first the organizations' experience with innovations, the innovativeness of specific leaders, and the way in which the external health care environment shapes the organization and focuses its attention. Additional characteristics of the organization that influence readiness to adopt and ability to implement a consumer health innovation include the degree of internal turbulence in the organization and the extent of both inter-department and intra-department cooperation.

*Organizational motivation* to adopt and implement consumer health innovations is shaped by several factors. First, among these is the articulation of the innovation with the organizational goals and the technology's ability to solve key problems faced by the organization. Additionally, the impact of the

TABLE 5.2. The regression R-square performance of the two comparative models.

| Regression R-square | Conjoint analysis model | MAU model |
|---|---|---|
| 700 profiles modeling | 0.78 | 0.71 |
| 120 profiles evaluation | 0.72 | 0.66 |
| 25 cases validation | 0.60 | 0.62 |

technology in terms of resources available and anticipated cost savings shapes the organization's motivation. Corporate administrator support, or lack thereof, influences the entire organization's motivation to adopt and implement these technologies. The final motivation is an organization's desire to be responsive to needs expressed by patients.

Certain aspects of *the innovation* itself also shape the adoption and implementation process. The technology's affordability to its intended users as well as its accessibility and ease of use must all be considered. In addition, technical aspects of the innovation, such as regularity of updates and availability of technical help for clinical staff and users, provide guidance regarding the type and amount of resources likely to be needed to facilitate the adoption. Finally, knowing how much the innovation is actually used provides benchmarks that confirm whether the process of implementation is going successfully or where mid-course modifications are needed.

The decisions to deploy consumer health informatics innovations must be followed by internal *promotion* of the commitment and the acknowledgment of the challenges as well as goals and progress toward those goals. Depending on the situation, external promotion to consumers may also be beneficial. The presence of corporate-level champions who have substantial influence facilitates the promotion process. At the department level where the innovation is most evident, the presence of influential department champions also helps shape the innovation process. The absence of these key players does not doom an innovation to failure, but rather indicates where compensatory strategies must be employed.

Characteristics of the *implementation process* also contribute to the success of the implementation. Putting in place processes and procedures to identify, refer, and support users facilitates the implementation, for it becomes easier to get the innovation into the hands, daily lives, and clinical care processes of the intended recipients. The absence of these processes causes confusion, and can interfere greatly with the innovation.

The inclusion of recruitment strategies consistent with clinical work flow and use of the technology within the unit's standard procedures ease implementation. Furthermore, the extent to which the institution can customize and put its own stamp of content or authority on the innovation determines both the amount of resources needed and the ease of implementation. Introducing innovations for direct-to-patient use causes spillover effects on staff, and clear determination of implementation role training for staff facilitates adoption. Incorporating feedback to remove barriers and improve the implementation process is also a facilitator.

The innovation's *fit within the clinical department or product line* shapes implementation success, with those innovations most aligned with department resources and least demanding of staff workload or business process change being most likely to succeed. Also, situating consumer health innovations clearly in a given care department has advantages over the more general placement on a corporate website or library. Creating small pilot demonstrations in environments where success is likely, where the innovation fits with other services and procedures, and where technical challenges can be managed affords additional support. Careful assessment of staff familiarity with the technology, plus anticipation and monitoring of its effect on staff workload, will smooth the implementation process by ensuring that resources or training can be provided in a timely manner.

Finally, the *awareness and support of key personnel* will shape the success of the innovation. When key opinion leaders and department managers support the technology, and key personnel understand the implementation goals and strategies, success is likely. Gaining clinician buy-in and ensuring that clinicians see the technology as valuable for their patients, and encourage its use, shape how the innovation will progress. Likewise, managing the attitudes of skeptics, particularly powerful ones, is critical in shaping the ultimate configuration of the implementation plan.

Careful study of each factor illuminates to the organization and to innovators dimensions of success. Clinicians and administrators can appraise their organization's readiness to adopt, determine the extent to which the current state of the innovation will tax or capitalize on existing resources, and get a fair appraisal of both the investment needed to make the innovation a success and the likely payoffs to arise from these investments. Using this framework can help institutional planners determine whether the institution is ready to make the commitment to adopt and innovate in this manner.

## Summary

Appraising success of an implementation requires understanding the factors that contribute to successful implementation and defining a measure of success. Through a process of elicitation we created a model gleaned from the wisdom of experts. We tested this model on a series of hypothetical profiles and by interviewing individuals involved in IHCS implementation. We now turn to six case studies to illustrate the model elements in more depth.

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# 6
# Introduction to Case Studies

David H. Gustafson

In the previous chapters we described the challenges of an IHCS implementation and introduced one particular IHCS, the CHESS program. We also described how we have developed a model to predict and explain the results of an IHCS implementation and discussed the elements of the model. With that as foundation, Chapters 7–12 present six case studies of IHCS implementations and consider the elements that led to relatively greater or lesser success. Interviews were conducted at the participating organizations with staff members who were involved with the CHESS implementation in various roles: directly implementing CHESS, providing administrative support within the organization, or using CHESS as a patient education tool within a clinical practice. Typically 10–12 people from a cross section of staff (administrative, clinical, implementation) were selected for the interviews. Note that names, locations, and other identifying features in these case studies have been changed to protect the anonymity of the participating organizations.

Five of these case studies describe implementations in hospitals with community clinics (Strand Hardin, Union, Grace, and Simpson) and HMOs (Associated Practice), while one (Caregiver Resource Center Network) describes an implementation within a set of community-based organizations aimed at helping family caregivers of patients facing dementia. Each case study describes the organization, its history of CHESS adoption, the implementation approach employed, and how the implementation played out. Then the chapter evaluates the implementation in the context of the model we developed to demonstrate how various elements of the model affected implementation success. One point to keep in mind is that the case studies contain a variety of analysis. For example, one case study focuses on a single analysis of an implementation of one CHESS module (e.g., breast cancer); another case study offers one analysis of an organization's efforts to implement several CHESS modules; and in some cases there are two separate analyses for two CHESS module implementations within the same organization because the implementation efforts had such different results. (Note that CHESS as a whole will at times be referred to as "the system," while "module" refers to the disease-specific resource offered to patients and families.)

Success is appraised in two ways: one, the adoption and implementation of the specific product (in our case, CHESS); second, embracing of the idea as a foundation for future development. For example, Simpson is considered quite successful, not because CHESS endured but because the organization built on the concept and created a patient portal. Union Hospital generated institutional support and CHESS is still being used despite the need to engage independent practitioners in a common process. The Caregiver Resource Center Network embraced the concept and used the CHESS core to build their own caregiver resource, but it is a module that no one else uses because it is highly tailored to this organization. All were considered to be successful implementations.

In order to facilitate reading the case studies, two graphics have been developed. The first is a bar graph at the beginning of each case study showing the factors and the related elements. For each of the six case studies, the factors and elements that had the greatest positive and negative influence on the implementation outcome are highlighted. The graph is split in half to show both the positive and negative effects. The length of the bar indicates whether the impact on the implementation was weak or strong.

The second graphic is a matrix (Table 6.1) that summarizes in one place the performance of all six implementations on all the factors and their elements. The columns list the six organizations and the rows list the factors of the model and their elements. Each cell then shows a "+" or "−" indicating direction of effect. A plus sign (+) indicates that the element had a positive influence on this implementation. A negative sign (−) indicates a negative influence. Some cells contain comments to clarify a point. And other cells contain both signs (+/−). These indicate that there were multiple implementations of CHESS (e.g., in the breast clinic and in the HIV clinic) with differing performance on that factor. In some cases, an element was either not present at that organization or not important in the implementation; "Not present/Not applicable" is written in the cell.

In addition, each case study pulls out some aspects of the case of special interest to the reader. "Focus On" boxes are included in included in the narrative section of the case to highlight to that organization as it relates to a factor in the model. The analysis section shares "Lessons Learned" as recommendations for others who are implementing IHCS. While it is tempting to infer that an absent factor could have been addressed by just including that factor, facilitating an implementation is not really that simple. "Lessons Learned" help point out solutions that could have helped, but keep in mind that these are not evidence-based recommendations.

The case studies allow us to delve more deeply into different aspects of the implementation model, allowing the model to come alive for the reader. Not all factors will have the same influence on implementation in each case. In each of the six chapters, we present a case that details the multi-year experience of implementing and sustaining CHESS in a given institution. We draw from interviews of present and former employees of each institution to get an "on-the-ground" feel for what it was like to introduce and sustain CHESS in an institution. Using the seven-factor implementation model, we analyze the influence of each factor on the implementation process and outcome. We have studiously avoided applying

TABLE 6.1. Model matrix with case studies ordered from least successful to most successful.

| Factor | Element | Associated Practice | Strand Hardin | Grace | Caregiver Resource Network | Union | Simpson |
|---|---|---|---|---|---|---|---|
| Organizational Environment | Organizational experience with innovation | + | +/− | +/− | Not present or not applicable | + | + |
| | Leader innovativeness | + | − | + adoption only | + | +/− | +/− |
| | Internal turbulence effect | + (no impact) | − | − | + (no impact) | + (no impact) | + (no impact) |
| | Within-department cooperation | + In CHESS home dept it was good initially, − bad later; − one clinical department | − hurt BC | + Regional hospital − Cardiac center | Not present or not applicable | − | + |
| | Between-department cooperation | +/− | Not present or not applicable | − | +/− | − | + |
| | Influence of external health care environment | +/− | +/− no influence | + adoption | + | − | + |

*(Continued)*

Table 6.1. *(Continued)*

| Factor | Element | Associated Practice | Strand Hardin | Grace | Caregiver Resource Network | Union | Simpson |
|---|---|---|---|---|---|---|---|
| Organizational Motivation | Fit with key organizational goals | + early − later | +/− Unclear goals due to leadership change | + initially, less after new CEO | + | + | + |
| | The technology's ability to solve a key problem | − | − | + need with early patient discharge | + | + | + |
| | Costs and savings from the technology | − | − | − | Not present or not applicable | − | Not present or not applicable |
| | Patients' expressed needs for the technology | − early on no demand | +/− | + | + Varied among sites | + BC | +/− |
| | Corporate administrator support | + early − late | + led to adoption; repeated effort | + initially, then not | + | − | Not present or not applicable |
| | Resources | − | − | − | − Limited at the end | + BC/PC − HD | + |
| Technology Usefulness | Regularity of updates | − HIV out of date + others | − | N | − initially + later | +; −HD | − |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Affordability for patients | + | + | +/− Varies – some donations of equipment | + initially − later | + | + |
| | Convenience of access | + | − initially + later with Internet | N | − initially | + | + |
| | Ease for patients to find what they need | − | − | N | +/− | Not present or not applicable | Not present or not applicable |
| | Technical help for users and staff | + implementation team support; − developer support | − | − | + available later | Not present or not applicable | + |
| | Usage rates | − | − | − | Not present or not applicable | + BC − HD | Not present or not applicable |
| Promotion | Promotion within the organization and to patients | + | − | + within org − to patients | + more at the end | +/− | + |
| | Corporate champion existence | + initially; then − | +/− | + | + | +/− | − |
| | Corporate champion influence | + early − later | − | + early | + | + | − |

*(Continued)*

Table 6.1. *(Continued)*

| Factor | Element | Associated Practice | Strand Hardin | Grace | Caregiver Resource Network | Union | Simpson |
|---|---|---|---|---|---|---|---|
| Promotion | Department champion existence | − not in clinical depts. + home dept early, − later | − BC did not exist; + Internet | − no docs, a few nurses | +/− Varied across orgs | − | + |
| | Department champion influence | − | − | Not present or not applicable | Not present or not applicable | +/− | + library; − other |
| | Regular progress reports sent | − | − Internet: lost attention of champions | Not present or not applicable | + in 2nd phase | − | − |
| Implementation Process | Technology in standard guidelines | − | − | + BC − HD | + | + BC | − |
| | Customizability | + | + | − | − | + | − |
| | Processes to identify, refer, and support users | − | −research protocol with restricted criteria | − CHESS completed with other research studies for staff attention | + | + | − |

|  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|
|  | Implementation role training for staff | + | − | + regional | + | + provided, but − not trained early enough | − |
|  | Feedback is used to remove barriers and improve processes | + (clinicians)<br>− (patients) | − | Not present or not applicable | + | +/− | +/− |
| Department-Technology Fit | Home department respected | − eventually | + Internet delivery good fit | − orphan dept., no connections to depts. that might use CHESS | + | + | + |
|  | Implementation started in unit where success likely | − | + but ended up badly | Not present or not applicable | − better to start with fewer implementations | + | + |
|  | Fit with other services/procedures | − | − | − | + | −<br>+ preventive cardiology | + |
|  | Technical difficulties | +/− | − slowed BC recruiting, training, undercut use & champions | − | − | Not present or not applicable | − |

*(Continued)*

Table 6.1. *(Continued)*

| Factor | Element | Associated Practice | Strand Hardin | Grace | Caregiver Resource Network | Union | Simpson |
|---|---|---|---|---|---|---|---|
| Department-Technology Fit | Staff familiarity with the technology | − | − | +/− varies | − | +/− | + |
| | Effect on staff workload | − | − | − increased due to recruitment | − increased due to installation | Not present or not applicable | − |
| | Effect on care provider role | − clinicians were threatened | +/− Most clinicians did not see it threatening | Not present or not applicable | − Lots of fear at first | − clinicians were threatened | Not present or not applicable |
| Key Personnel Awareness & Support | Key opinion leader support of the technology | + early<br>− later | +/− | +/− | + eventually | +/− | + |
| | Department manager support | + early<br>− later | +/− | +/− | + eventually | + | + |

| | | | | | | |
|---|---|---|---|---|---|---|
| Key persons' understanding of implementation and use | − too resource intensive | − | − | + eventually | Not present or not applicable | + |
| Clinicians see their patients are benefiting/not affected | − | − | + regional | + eventually | + | + |
| Clinician advice for patients | +/− | +/− | +/− | + eventually | +/− HD<br>+ encouraged BC use | +/− |
| Powerful skeptics' concerns are addressed | − Clinicians remain skeptics | − | − | + Concerns addressed eventually | Not present or not applicable | + concerns addressed |

| | |
|---|---|
| + | positive effect on overall level of success |
| − | negative effect on overall level of success |
| +/− | effects in both directions |
| N | no information |

BC—CHESS breast cancer module
PC—CHESS prostate cancer module
HD—CHESS heart disease module

normative assessments or unsupportable interpretations in this analysis process; rather, we present the implementation experience and leave the interpretation to the reader.

Our evaluation of the model overall, and our recommendations for future attempts at IHCS implementation, of course, relies on all the case studies, and many readers will find it most profitable to read them all before considering our conclusions at the end of the book. For these readers, we provide the matrix here, before the case studies, so that it may help them anticipate and keep straight what they will find in each chapter.

Other readers, however, may approach these case studies with a primary interest in one or two factors of the model, or even a single element, depending on one's role within the organization. In such cases, one can use the matrix as a guide to reading the chapters more selectively. For example:

- If one is interested in seeing how a positive organizational environment influences implementation success, we suggest that the Simpson case be read first. On the other hand, the Strand Hardin and Associated Practice cases portray implementations within an uncertain organizational environment.
- Motivational issues might be best seen by starting with the Caregiver Resource Center Network implementation because it portrays a positive motivational environment. That might be followed by a reading of the Associated Practice case. There, motivation was high at the beginning and then, for a variety of reasons, dropped sharply.
- The Union case describes an implementation that was quite successful in meeting user needs. This is in contrast to the relatively unsuccessful effort in meeting user needs in the Strand Hardin and Associated Practice case studies.
- An effective promotional effort is described in the Caregiver Resource Center Network case in contrast to the less successful promotional program put forth in promoting the heart disease program in Strand Hardin. Note that the promotion of the breast cancer program at Strand Hardin was well done.
- The implementation process was quite successful in the Caregiver Resource Center Network case and the Union case. It was substantially less so at Simpson Hospital.
- Fit in the department was rather positive in both Grace and Associated Practice. The Caregiver Resource Center Network is an example of an implementation where departmental fit was not particularly good at the start.
- In contrast, the Caregiver Resource Center Network was very good at creating awareness and support for the implementation. Strand Hardin and Associated Practice were less successful in this arena.

We hope you find these case studies to be a good way of learning about the model, but more importantly that they help you learn what it takes to be successful. If nothing else, they demonstrate that implementations can be successful without all factors working in their favor. And they can fail when just a few key factors fall below a critical threshold.

# 7
# Associated Practice, 1992–1997

Susan Dinauer, Pauley R. Johnson, Tracy Siegler, Gail Casper,
and John Fellows

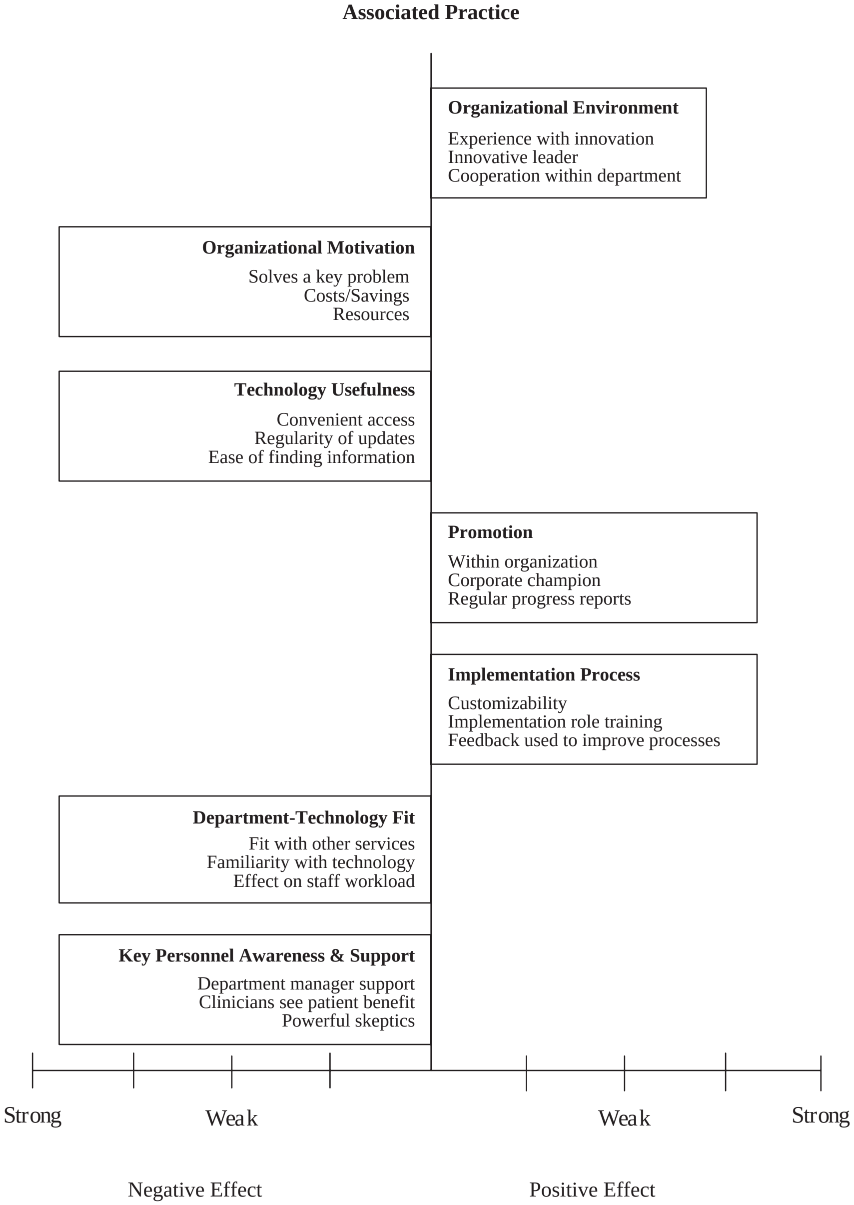
In the early 1990s, Associated Practice was the largest HMO in the metropolitan area it served. Its size resulted from mergers and reorganizations occurring at the time. Associated Practice was also one of the first organizations to implement CHESS – a new and innovative technology system. In this study we will examine factors affecting the implementation of CHESS, including its appearance at a time when most of the public was unfamiliar with the use of personal computers, resistance to the system from clinicians, and the impact of cost-cutting measures within Associated Practice.

## 7.1. Description of the Environment at the Site

Associated Practice was created as the result of a merger between two health plans. Health Plan I was a network model Independent Practice Association (IPA), and Health Plan II was a staff model HMO. The merger made the newly formed organization the largest HMO in that metropolitan area, serving a total population of over half a million members. The structures of the two original health plans made the merged organization a dual model–managed care organization containing both staff and contracted providers at hospitals and clinics throughout the geographical area. Approximately 40 percent of members received their care at clinics owned by Associated Practice, and 60 percent received their care at clinics that were contracted to treat Associated Practice members. Clinical goals for this new organization included the following:

- Childhood immunizations – increase rates
- Cardiac – reduce the number of cardiac inpatient visits
- Breast cancer – increase mammography rates, decrease incidence
- Domestic violence – reduce visits related to domestic violence
- Diabetes – better controlled
- Dental health – improve access
- Maternal/child health – increase numbers of preventative check-ups.

The merger that created Associated Practice was followed by a merger between the new organization and a local hospital. As a result of these two mergers, the



organizational environment became very unstable. Upper-level managers and administrators were preoccupied with finding the best way to align departments, some of which were duplicated in the different organizations. Some administrative positions were eliminated as clinics and surgery centers were merged, closed, or moved to different facilities within the system.

As a result, staff within individual departments and clinics continually adjusted to changes. Looking back on the environment during the time of the implementation, an employee in the department that housed CHESS explained that instead of focusing outward on innovations that were available at the time, people throughout the organization were dealing with the changes going on around them by turning their attention inward. "It was a period of lack of identity. The practice groups were really struggling trying to figure out who they were in this larger organization, and where they fit. And so, you know, people tend to then – retract."

In addition to the instability created by the mergers, the environment for managed care in general was competitive in this marketplace, which placed Associated Practice under severe financial constraints.

The mergers had an especially turbulent effect on the department that was home to CHESS. In the four years that CHESS was housed in the Center for Health Promotion, there were three different directors and seemingly constant change in the organizational structure of the department. Each new director had to be educated about CHESS and made to see the importance of the system. In addition, partway through the implementation, the Center moved out of clinical practice and into the marketing division.

## 7.2. Timing of the Implementation in the History of Chess

Associated Practice was among the first organizations to implement CHESS and became a member of the CHESS research consortium. At the time, CHESS was a new and innovative technology, so there were still many "bugs" to work out of both the system and the process for implementation.

The CHESS modules for breast cancer patients and HIV/AIDS patients were customized for Associated Practice by including local resource directories and contact numbers. At the time of implementation, most homes were without computers and most people were unfamiliar with their use. In order for patients to access CHESS, computers had to be loaded with the CHESS module they would be using, and then loaned to the patients for use in their homes. Patients were then trained, often in basic computer skills, as well as in the use of CHESS.

At the time of implementation, Associated Practice was using a similar interactive health communication program called "Shared Decision Making." The programs were sufficiently similar that clinicians and staff frequently became confused about which was which.

## 7.3. Early Exposure and Decision to Adopt

Prior to the merger that created Associated Practice, Health Plan I had decided to bring in some innovative patient-focused programs to distinguish their company in the marketplace. These programs included CHESS and Shared Decision Making. The director of research and analysis at Health Plan I was aware of

CHESS through a previous affiliation with the university-based founder. After the merger, staff from Health Plan I and the developers of CHESS worked to promote it within Associated Practice as an innovative way to provide patient support and education.

The CEO for Health Plan I, who became medical director for Associated Practice after the merger, and the director of research and analysis for Health Plan I (and for Associated Practice after the merger) were leading supporters of CHESS. As a result, they emerged as champions for the system. The director of research and analysis was instrumental in developing the idea for a research consortium to advance interactive health communication systems (IHCS) like CHESS.

With the help of the two champions, the developers met with and demonstrated CHESS to various clinicians and leaders at Associated Practice, and discussed its use in the organization. A few months later, the president and CEO approved the membership fee to join the CHESS research consortium, as it was called. The consortium was created to disseminate, evaluate, and contribute to the development of new topics and enhancements for systems like CHESS.

CHESS was housed in the Research and Analysis Department, which had funded consortium membership. A project director was hired, reporting to the director of research and analysis. A steering committee for the system was formed in order to plan the implementation and research. Research objectives included understanding the short- and long-term benefits of CHESS to patients and how to integrate the system into practice. Steering committee members included the newly hired project director and the director of research and analysis, as well as representatives from Health Education, Clinical Services, and Operations. The necessary approvals were obtained for a CHESS research project to evaluate the use of CHESS by patients with breast cancer or HIV. Associated Practice funded the research study and no outside funding was sought. The pilot sites for the study were identified.

In November, the director of research and analysis, a key supporter of CHESS, left Associated Practice. As he was leaving, the individual clinics of the two health plans were merging, so the CHESS project and its director moved to the Population Health Department, reporting to the other CHESS champion, the medical director. A researcher in the Associated Practice Research Foundation assumed the research lead for the project as the CHESS principal investigator. The medical director continued to promote the use of CHESS and explore ways to integrate it within the delivery system.

Also during this period, various ad-hoc groups reviewed and approved the content of CHESS and the study. By inviting content review, the project director and other CHESS supporters gave the clinical practice staff the opportunity to "buy-in" to the use of CHESS. They were effective in presenting the system as a unique and innovative opportunity that individual clinics would be able to take advantage of, rather than something that was going to happen whether they approved of it or not. Although no one came forward as being adamantly opposed to the use of CHESS, there were few enthusiastic supporters. Clinicians, in particular, seemed apathetic toward CHESS.

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FOCUS ON: *Promotion and Implementation*

As the project began, those involved worked hard to promote CHESS, despite a difficult environment, by presenting it to various groups who might be interested. Because of the recent merger, people and departments were struggling to find their places in the new organization. They also had to learn to be teammates with people who used to be their competitors. Taking an approach that said, “Here’s a new system that you are going to try” could have created unnecessary tension in newly forming relationships. Instead, the CHESS supporters went to great lengths to discuss and demonstrate CHESS with key people and sought their input regarding the innovative system. When the processes for implementation were designed, the people promoting CHESS made a point of consulting with the clinics. It was essential that they know existing processes in order to determine how CHESS could be integrated within the clinic.

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## 7.4. Implementation of Breast Cancer and HIV/AIDS Modules

This implementation proceeded in two phases: a research study alone and research study plus general access.

### *7.4.1. Study Implementation*

At the beginning of the year, Associated Practice purchased a local hospital, thus adding a new and diverse population to the organization. The hospital was a trauma center, and it had a well-established health education department. The departments of Health Education and Population Health merged to become the Center for Health Promotion under the medical director. A director for the Center was hired to integrate the efforts of the Health Education and Population Health departments as well as to develop strategic goals for the center that fit with organization-wide strategic goals. The CHESS project director now reported to the Center’s new director.

The project director was part time, and thus did not have time to provide all the support that would be needed to recruit and support patients for the CHESS research study. In March, a CHESS coordinator was hired to do the day-to-day implementation work. Research and Analysis and Health Education funded the position. A research team for the project was created, which included the CHESS principal investigator, another representative from the Associated Practice Research Foundation, and the two staff members assigned to implement CHESS – the project director and the newly hired CHESS coordinator.

The administrative structure and processes for recruitment and enrollment in the study were put into place. The developers provided training in various implementation functions for the project director and CHESS coordinator. Materials for enrollment and marketing were developed, along with a resource directory that would be included in CHESS. Sixty computers were purchased and readied for service with the assistance of the Information Services department. The director and the coordinator used a variety of marketing strategies to promote the study including demonstrations to physicians and nurses, meetings with key clinicians and staff, and preparing news releases.

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FOCUS ON: *Implementation*

It goes without saying that an effective implementation requires adequate resources. However, sometimes a very important resource, time, is overlooked. The implementers of CHESS at Associated Practice recognized that although there was already a part-time project director and others dedicating some of their time to work on the project, an implementation coordinator was needed. Had there not been a CHESS representative to develop relationships with the clinics, promote the system, train users, and deliver computers to patients' homes, the over-burdened clinics would have had to do this. As a result, some of the functions would not have been performed at all.

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The CHESS coordinator played several important roles. In addition to contacting interested patients and installing computers for those patients who received CHESS, the coordinator also facilitated the CHESS discussion group and responded to “ask an expert” questions. As a public health specialist in maternal and child health, and in order to act as the “expert” in both breast cancer and HIV, she consulted her contacts in the community and kept her knowledge current by reading journals and other resource materials.

Monitoring and refinements of implementation continued including marketing, contacting clinical staff, and developing new materials. The coordinator visited clinics to schedule meetings with nurses and to demonstrate CHESS. At each site she left printed information and forms to use for referring patients.

Recruitment for the research study began. Breast cancer patients were recruited in the surgery departments at two clinics, and HIV patients were recruited from the infectious disease departments at the same two clinics. Several clinics now had computers that could be accessed by providers and used to demonstrate the system. The recruiting process at several locations involved, first, confirmation of the patient's cancer by the pathologist. Second, the surgeon would recommend CHESS to the patient and, third, a nurse would meet with the patient. If the patient wished to participate, the coordinator or project director was then notified.

As recruitment continued, it became clear that a substantial percentage of eligible breast cancer patients were not being referred to CHESS. The project director and coordinator spoke at a surgeons' journal club meeting and at a breast cancer conference in an effort to enlist cooperation. A letter was sent from the research team to providers asking for more referrals. A head nurse explained the problem:

> The comfort level of some of the surgeons with an outside person giving patients background information on their options really determined how likely they were to refer that person to the shared decision making process. If they were very comfortable with it then it was more a likelihood that they would say 'you know, why don't you see this module, come back, and we'll talk some more.' Some of the surgeons felt that it was their job, it was their duty, to explain the options and make a recommendation on the best way to approach this lump.

The head nurse also observed that some types of patients were more likely to be referred to CHESS than others. "Referrals tended to be given to patients who seemed to be more articulate; maybe more highly educated, if they already indicated that they were familiar with computers, or had an interest in that area." Others were less likely to be referred. "Patients who didn't have a lot of questions, or just seemed to go with the flow with whatever the surgeon wanted and didn't inquire a lot, probably were not referred as frequently as those who had many questions."

### FOCUS ON: *Fit in Department*

An important element of *Fit in Department* is alignment with philosophies of the intervention with nurses and doctors. One barrier that may not have been anticipated by the implementers was the change in philosophy of patient education that CHESS represented. They did not fully understand the local physician culture that physicians were a source of help for medical needs, including information, and therefore might not wholeheartedly embrace a system that leaves education and support up to the patient, a computer, and a group of university researchers not affiliated with their health care system in any other way. Some doctors, nurses, and staff may not have felt at ease using computers themselves, making it difficult to recommend computer-based education and support to patients. Many patients were also not prepared to take an active role in information-seeking, and may have been intimidated by the idea of using a computer. If implementers had been aware of these types of resistance issues, they might have been able to take action to more effectively overcome the barriers these issues presented.

In one of the surgery departments, a personnel struggle among clinical staff interfered with recruiting. The introduction of a new head nurse changed the management structure of the department. In response, staff appeared to resist new leadership and tried to undermine changes in the department, including educational systems like CHESS. Eventually the head nurse asked to be transferred. From her point of view, CHESS was not distributed to as many breast cancer patients in her department as it should have been because of staff resistance. The head nurse explained, “The fact that they created this head nurse position that wasn’t ever there before, the fact that I came in and I found many outdated practices that they were following and I tried to upgrade – they resented that. They were employees who were there for 10, 15 years before I got there. It was just resistance to change.” Missing in this department were the teamwork and commitment to recruitment that often seem to promote implementation success.

Recruitment to the study with the CHESS “Living with HIV/Aids” module was handled by the Infectious Disease department staff, following the same process employed in the surgery clinic with breast cancer module. However, the evaluation of the CHESS HIV module was hindered by several problems. Currency of the content was the first problem. As the Internet had yet to emerge as a force in health care, CHESS was implemented as a freestanding system, making updates cumbersome. Some computer-savvy patients believed they could get more up-to-date information on the Internet, and dropped out of the study.

Other problems were emerged in the online discussion group. While a core group of patients used it often, those who were not part of that particular group often felt left out. The coordinator, who also served as the discussion group facilitator, tried to make the discussion group more inclusive, but felt she was unsuccessful.

Finally, it was challenging to get equipment into the homes of patients willing to participate in the study. For each person, the research staff had to load the system onto a research personal computer, deliver the computer to the home of the patient, set it up, and show the patient how to use both the computer and the CHESS module. Although the system was designed to be used by novices, some training (typically about an hour) was required in order to use CHESS. Each computer also collected data on length of time people spent in each service of the module. When the study period was over, research staff had to return to the home to pick up the computer. Before it could be used again with a new study participant, any information saved by previous users had to be erased and the CHESS system reloaded. Sometimes the process took hours. Such issues added to the expense of using CHESS.

Enrollment in the CHESS study ended with a total of 107 participants: 36 breast cancer patients, of whom 19 were randomized to receive CHESS, and 71 HIV patients, of whom 34 were randomized to receive CHESS. Although enrollment was lower than expected, useful findings emerged. Participants found CHESS easy to use. More than one-third of their time spent using CHESS was between 9 p.m. and 7 a.m., when other forms of information and support were less likely to be available. Breast cancer patients used the system on an average of 4.8 times per week and HIV patient use averaged seven times per week. Both groups used CHESS more at the beginning than at the end, with weekly use tapering to one session or less by the end of the 3-month access period. Data also revealed important differences in needs, as expressed by HIV and breast cancer patients, and how those needs changed over the study period.

As the study concluded, organizational shifts continued. The director of the Center for Health Promotion, who had been hired at the beginning of the year, was let go. The center was restructured and a new director appointed. CHESS was moved under the director of clinic relations within the Center for Health Promotion.

### *7.4.2. Clinical Implementation*

Subsequent to completion of the study, "open enrollment" began. As such, criteria for eligibility were loosened and CHESS was made available to all potential users of the respective modules. The CHESS project director and the coordinator could then explore innovative ways for getting the system to patients. New materials were created for marketing CHESS and contacts were made with all Associated Practice clinics. Clinicians and staff continued to follow the procedures established during the study period. Promotion of CHESS internally as well as directly to Associated Practice members continued. The target audience was expanded to include many different clinics and to seek referrals from case managers and home health nurses.

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FOCUS ON: *Promotion*

As open enrollment began, the coordinator and the project director recognized that further promotion of the system would lead to increased enrollment from patients who previously had not met study criteria. The project director hand-delivered new CHESS materials and sent a letter announcing the end of the study and the beginning of open enrollment, to each clinic. The pair continued to present CHESS as they had during the study, and new opportunities for the system were sought out with renewed vigor.

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During open enrollment, more clinics were added to the list of those referring patients. The infectious disease department at the hospital that had been purchased by Associated Practice began to refer its HIV patients. However, since that hospital served many uninsured patients, the population in Infectious Disease was much more transient than at the other Associated Practice clinics. Staff was concerned that patients would not return the computers, so only a handful of referrals from that department were made. Breast cancer referrals only came from surgery departments during the randomized trial, so when open enrollment began, Oncology departments from the same clinics referred its patients, as well. Because CHESS was no longer randomized and would not interfere with another study being conducted at that hospital, another Associated Practice hospital began to refer breast cancer patients.

One physician described the benefits of systems like CHESS:

> My major concern was that women get as much information as possible about their cancer and be as informed as they can be, and the problem is getting that information to them so that they can retain it. It's just difficult to do, and if you have a half an

> hour you just can't do it. If you have two hours you can't do it. This is the kind of thing that they need to read about it and you give them the initial information and they can call you back and you can go over it and it really helps to get some definite systems like this CHESS or Shared Decision Making to get them through all the questions.

However, few physicians routinely referred their patients, particularly older patients:

> I thought that (CHESS) might be a little bit difficult for older women that weren't part of the computer phase. I think they might have a hard time with the technology. The woman who was post-menopausal, 60s, 70s, 80s – hardly any anxiety, I probably wouldn't refer that patient to CHESS because it might create a lot of anxiety just trying to deal with the technology part of it. There are some women who just don't want (knowledge). There are some women who just say, 'I'm here to see you, you tell me what's in my best interest; you're the doctor.' They don't want Shared Decision Making; they don't want to look at the pamphlets. You just know they want you to take care of them. It's probably not a good thing, but that's the way they want it to be. I would say a more likely patient would be the younger one who was really anxious about all the options. The younger woman that just wants as much information as possible, that's the person I for sure would get involved in CHESS. They have to be motivated; they have to want to get knowledge. The younger patient, the anxious patient (which most of them are) – that would be perfect for CHESS because now they are in control and when they're in control some of that anxiety goes away.

One Center for Health Promotion employee thought that physicians would have recommended CHESS for their patients more systematically if they had had an incentive, motivation, or accountability to use the system. He felt that one of the reasons for the lack of motivation might have been that the project started as a research project, so the CHESS principal investigator had responsibility for patient participation. When open enrollment began, the responsibility did not shift to the physicians.

The CHESS implementation staff also looked into offering CHESS through community organizations that provide help and information to breast cancer and HIV patients. This would support the center's strategic goals of reaching out to a wider population. They also met with members of an employer group to explore setting up CHESS access at some worksites. The project director and the coordinator also worked with the developers to examine alternative ways to deliver CHESS besides the time-consuming and expensive delivery and pickup process that had been used during the study. All of these ideas were investigated thoroughly, but those that were found to be feasible were not seen as better than what was done during the study phase.

At the time when enrollment in the CHESS study was just getting started, Associated Practice began work on the development of clinical guidelines. Sometime after the randomized trial phase was over, the Associated Practice medical director talked with the CHESS founder to discuss the future strategy of CHESS implementation at Associated Practice in light of clinical guidelines development and what had been learned from the CHESS study. He told the founder that CHESS was too expensive, and too few patients were involved. Together they determined that in order for CHESS to survive at Associated Practice, it would have to be integrated into practice, viewed as part of standard procedures, and integrated with clinical guidelines. There would have to be a way to monitor providers to determine whether they were following the guidelines, in particular whether the provider was recommending CHESS. Furthermore, patients would have to know about the guidelines to understand that CHESS should be offered to them as a resource. Eventually, CHESS was included as a recommended patient education resource in the local guidelines for breast cancer treatment as well as in the local guidelines for testing, counseling, and management of HIV.

The Center for Health Promotion continued to restructure, and the CHESS coordinator position was eliminated. She described the restructuring as a time when "most of the positions in the department were rewritten and the whole organization at the Center was changed, and positions were posted, and we all submitted applications and interviewed for new positions." Once the CHESS position was eliminated, independent contractors were used to install computers and train patients. The developers assumed responsibility for facilitating the discussion group and answering the "ask an expert" questions.

The CHESS founder talked with Associated Practice's CEO and a group of staff from the Center for Health Promotion about CHESS and other research opportunities as they related to the organization's corporate initiatives. The presentation focused on partnerships, the future of CHESS, opportunities for new modules, and connections to the organization's Internet system. The CEO was not a strong supporter of CHESS, and the discussion helped him understand why the organization had adopted the system and was spending significant amounts of money to support it.

Associated Practice hosted the first CHESS research consortium meeting. By this time there were other members of the consortium with whom the project director and others at Associated Practice had developed relationships.

The Center for Health Promotion went through another reorganization. The Center became part of the Member Health and Marketing Department. The medical director, one of the original champions of CHESS, lost direct control of the Center, which included CHESS as well. The director of the Center and the Center's clinic relations section director, who had only held their positions for about a year, both left their positions. Now that the Center fell under Member Health and Marketing, the Center's strategic goals began to shift to fit with the goals of that part of the organization. Also, greater emphasis was placed on monitoring costs. In the reorganization, CHESS was moved under Clinic and Community Initiatives, so the project director reported to the newly hired director of Clinic and Community Initiatives.

The project director continued to focus on different avenues to promote CHESS. A communications advisory group was formed to revise CHESS's communication plan. Efforts included making presentations at professional meetings, connecting with different Associated Practice workgroups, doing outreach to clinics that included setting up CHESS computers at clinic locations, writing articles, finding new provider champions, and analyzing Associated Practice databases on breast cancer and HIV populations eligible to use CHESS.

A CHESS prescription pad, and later on a new CHESS provider brochure, were created. CHESS was featured in the Associated Practice member magazine, and included in an e-mail newsletter to all providers.

Connections were made with Associated Practice staff involved with other information technologies. Providers in surgery, oncology, and infectious diseases, as well as administrative staff, were interviewed to discuss ways to facilitate more referrals. The CHESS implementation position was re-created, and a new staff member was hired to do home visits and set up CHESS computers.

Other CHESS modules were being developed, and the project director discussed with others in the organization the possibility of Associated Practice being involved in the development and/or use of the new modules, and how they might fit with the strategic goals of the organization. The project director and the researcher (who had been the principal investigator of the CHESS study) responded jointly to a CHESS consortium proposal to develop a CHESS heart disease module that would tie in with an Associated Practice strategic cardiac goal. The project director contacted the Lifestyle Management Center and Cardiology Clinic staff to gather support for the project. Needs assessment surveys were given to 100 cardiac patients to be used in the development of the new cardiac module. The CHESS developers analyzed the data from the needs assessment and found that cardiac patients wanted help in following their rehabilitation goals, as well as help in dealing with fears of dying, and even help in understanding their bills. A report specifically for Associated Practice was generated and sent to them. However, the cardiac doctors were not closely involved in the development of the heart disease module after the needs assessment was over.

The CHESS developers reported on the data from the implementation survey. Patients had been surveyed on their satisfaction with the CHESS system and the home visit. The project director and other Center for Health Promotion staff met with the developers to discuss CHESS evaluation and possible connections to customer satisfaction surveys already being done to evaluate Associated Practice's strategic goals.

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### FOCUS ON: *Feedback*

One deficiency in the implementation was the incomplete system for feedback from users to those who had a stake in the continued use of CHESS. The data collection step was accomplished by the randomized trial and the continued collection of use and satisfaction data. However, the next step, regular feedback to the clinics or to managers and administrators, was missed.

If feedback that consisted of data, and stories or quotes from users had been given regularly to clinicians, managers, and administrators, it might have fostered a greater sense that the organization was taking part in a worthwhile and ongoing project, that enrollment was improving, and that patients were benefiting. Also, it is not clear whether feedback that was received by implementers was being used to improve CHESS or the processes for its use in the organization. Providers were interviewed and surveyed to determine reasons for low referral rates, but nothing changed as a result of the investigation.

At the end of 20 months of "open enrollment" fewer than 100 total patients were using CHESS. All 81 participants received surveys throughout the implementation; 32 were completed and returned. Of those, 97 percent felt "positive" to "very positive" about Associated Practice providing CHESS to patients in their homes, and 85 percent rated the CHESS overall as very good to excellent. Despite positive appraisals by users, the system had yet to take hold.

## 7.5. Termination of CHESS at Associated Practice

Enrollment in the breast cancer and HIV modules continued, and was increasing as the third year of open enrollment began. The research team was still analyzing data from the randomized trial and writing the CHESS paper for publication. The project director continued to develop relationships and encourage CHESS use by more clinicians. She also looked for new ways to increase the utilization of CHESS. Associated Practice staff continued working with the developers on the heart disease module, and there were more discussions about how an alcohol module would fit with Associated Practice initiatives.

Finances were tight throughout the organization at that time. There was much ongoing discussion about the role of health education and the Center for Health Promotion. CHESS was being evaluated for its worth as a marketing tool rather than a patient education tool, now that it had been moved under Member Health and Marketing. Some in the organization felt that the consortium fee was being used to develop new CHESS modules only, instead of to improve and help organizations implement current modules. This fueled concerns that it was a costly fee for reaching so few people and that the money was simply providing an opportunity for the developers to expand their own system. There was also concern that the large sum allocated to CHESS reduced funds available to develop other programs that were higher priorities for the center.

In March, the director of Clinic and Community Initiatives told the project director confidentially that CHESS must reach more patients to justify funding for another year, even though by this time it was probably too late for her to do anything about it. CHESS budget requests for the year were constrained, meaning that for the rest of the year they would have to work with fewer resources than they needed. A final decision to terminate CHESS was made in April and communicated in June to Associated Practice clinicians and staff as well as the developers.

During the 2 years of open enrollment, 95 patients used the breast cancer module out of an estimated 300 possible, and 42 patients tried out the HIV module out of an estimated 200 possible. The cost per patient was estimated at $1000 per year based on fixed fees such as consortium membership, employee salaries, purchase of equipment, delivery, installation and training for CHESS, and travel costs.

The director of Clinic and Community Initiatives described the decision to end the CHESS implementation:

> There wasn't any drive coming from the clinical side for this, and, so (the project director) was pushing a string uphill. So that's when we started down the path of interviewing providers, interviewing nurses. I mean, making appointments to go out and see them, and really probe, what is it going to take to get this thing implemented? And they came back with a wonderful set of learnings and really kind of some shock, about how ineffective our implementation had been. And it was at that time when I gave them six months or a year to address the recommendations that they had. At the end of that period of time, they still had not been able to move the ball forward – not because they did anything wrong, but because the care system wasn't ready to accept something like this.

She recognized that the system had been of great benefit to some patients, but it was too expensive and not reaching enough patients.

When asked whether the CHESS developers were helpful in overcoming the problems that were uncovered, the director of Clinic and Community Initiatives characterized the response in this way: the developers were interested and willing to listen, they were respectful of Associated Practice's decision to set a deadline, and that they spent many hours discussing the issues. However, she "didn't recall any specific recommendations that were feasible to implement." Instead, she felt, "There was kind of an exhortation – you guys are the ones with the answers, and we don't have a great deal to offer you. We want to help, but we don't know what needs to get done." She did not feel that the developers had offered any concrete, actionable advice on how to make the implementation a success.

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### FOCUS ON: *Awareness and Support*

In spite of a strong implementation effort, staff's unfamiliarity with this type of new patient education resource and potential of changing the clinician's role in patient education proved to be barriers that could not be totally overcome. In addition without support from key department level leaders, CHESS was not able to get past the barriers. The lack of significant clinical support could not be compensated for by good internal processes such as referral of patients and providing extensive support for actually getting CHESS to patients.

Nurses in the clinics who referred patients to CHESS seemed a little surprised that the project ended so abruptly. A nurse from one of the Infectious Disease clinics remembered there was "a push to really get it out there," and then the project director came and met with her and another nurse, "dissolving the whole thing." A nurse in one of the implementing Oncology departments said, "It felt like it just ended. Interestingly, at that point people did feel like, 'Bummer! We were just starting to gear up on how to get going on it and now it's not available at all.' "

The last patient was enrolled in CHESS in June, and computers were out of patients' homes by the end of October. Associated Practice's membership in the CHESS research consortium ended after four years.

## 7.6. Analysis

The model described in Chapter 5, Implementation Model Development and Testing, developed from the knowledge and experience of experts in the field as well as from case studies including those in this book, lays out seven major factors that affect the successful implementation of IHCS such as CHESS. The following section discusses how each of these major factors is illustrated by the implementation of CHESS at Associated Practice.

### *7.6.1. Organizational Environment*

The environment in which CHESS was implemented at Associated Practice was far from ideal. The external health care environment created financial difficulties for HMO's in general, and Associated Practice was no exception. Financial constraints were tight throughout the organization, and could have contributed to the termination of the implementation. CHESS was introduced during a period when multiple organizations were being merged. People struggled to "keep their heads above water" managing the changes that affected their work and trying to find their place in the new organization. Implementing something new like CHESS was not a high priority. In addition, continual shuffling of organizational players required the CHESS project director to constantly form new relationships with key people.

This was very much the case in CHESS's own home department at Associated Practice. The Center for Health Promotion served as the home department for CHESS during the four-year CHESS implementation. However, there were three different center directors and each had to be sold on the value of CHESS. The structure of the Center changed, as did the goals and focus of the Center, as each new director took over. This all contributed to the difficulty of implementing something new and innovative.

### *7.6.2. Organizational Motivation*

A major problem in the CHESS implementation was that ultimately it did not fit with seven specific clinical goals of Associated Practice. These goals were the basis for strategic planning and for making programmatic decisions. When finances became tight, those things that did not fit with the goals were in jeopardy. Thus because the CHESS modules did not address clinical goals, implementation was threatened.

Additionally, the Center for Health Promotion moved out of the medical realm of the organization, and into the business realm. The medical director, an original champion of CHESS, no longer had direct control over the Center, and there was a strategic shift toward marketing. A surgeon described how the goals of a department that is more connected with administration, such as Member Health and Marketing, might differ from the goals of a department that was connected to the medical director: “If some organization is going to need to lay out a lot of cash for [CHESS] then there has to be approval and tangible and reproducible benefits to those administrators in that organization, otherwise you’re not going to get the money.”

He explained that administrators like to see objective data showing that a project is going to save money for the insurance plan in the long run. He continued, “We as a medical group aren’t as interested in saving money for the insurance plan as much as having patients get the appropriate information, I think. I guess that’s why the business people run the businesses and doctors deal with the patients.”

The Center’s shifts in strategy toward marketing, and an increased urgency for CHESS to show cost-effectiveness, were factors leading to the termination.

### LESSONS LEARNED: *Fitting Programs with Goals*

Since the implementation of CHESS, Center for Health Promotion staff have found that fitting their programs for patient education with organizational goals does more than justify the program in the eyes of management. It also encourages clinics to make use of the programs. The Center’s newer, more successful programs align their efforts with other incentives that award quality improvement, so that they are helping physicians to reach those goals, creating incentives for participation. A director of the Center explained:

> The health plan offers its largest medical groups a program focused on incentives for quality. Every year for the past five years, the health plan, in collaboration with the largest medical groups, set their aggressive stretch targets. If the group meets those targets, which are adjusted upwards every year, then they have the opportunity to enjoy a potentially six-figure program bonus, basically, as a result of their quality improvement. And, to the extent we can, we try and line up our efforts consistent with those goals.

Had the physicians felt that CHESS assisted them in meeting an important organizational goal, the project might have been more successful.

CHESS lacked support from corporate administrators. There were no administrators who strongly opposed the project, but there were also none who showed strong support. Although the CEO of Health Plan I prior to the merger was a champion for CHESS, after the merger a new CEO took over. He was not a fan of CHESS, and he did not generally support projects that did not fit with his plans. After the merger the CEO of Health Plan I became the medical director of Associated Practice, but his level of influence waned as CHESS moved to another part of the organization. CHESS had no influential champions in administration after the merger.

The implementation of CHESS proved more costly than some within Associated Practice had anticipated. To have access to the system, the organization had to be a member of the CHESS research consortium, which cost $40,000 annually. Also, because the process of supplying a patient with access to the system was time-consuming and labor-intensive, a full-time employee was assigned to take charge of this responsibility. In addition, many hours were required to promote the system within the organization and in the community, and computers had to be purchased for use by the patients. There were limited resources available for computers, and if clinicians and staff signed on to do a research project with CHESS, they had to find their own funding, which no one did. This made spreading the innovation more difficult.

### *7.6.3. Technology Usefulness*

Once the computer was installed in the users' homes and they were trained, CHESS generally seemed to meet their needs in terms of affordability, convenience of access and use. Users of the breast cancer module found the information it contained to be useful and up to date. However, there was a problem with outdated information in the HIV module. At the time the HIV module was being implemented at Associated Practice, there were rapid developments in the care of HIV/AIDS patients. At the time, the module was updated only every 18 months and could not keep up with the changes. Some Internet-savvy patients found that they could get more current information on the Internet, and stopped using CHESS.

Another problem in general was low usage rates. The director of evaluation of measurement at the Center for Health Promotion stated it well: "These systems have an incredible opportunity to provide low-cost, high-reach kinds of service, and [CHESS] didn't. That was probably the disappointing part about it, is that it had the potential to go a long way, and reach a lot of people, and it really didn't." During the open enrollment phase, about 27 percent of patients who could have used CHESS had been enrolled. While the rate is similar to penetration rates found in other social marketing studies, it was disappointing to the leaders of Associated Practice.

### *7.6.4. Promotion*

The project director and the coordinator worked hard to promote CHESS to the organization and to patients. They met with doctors and nurses in the clinics, often having CHESS loaded on a computer and demonstrating to clinical staff how the system worked and what it contained. They spoke at professional group meetings and conferences, and sent letters to providers. Brochures for patients and providers were created, and CHESS computers were set up in various clinics so that staff could examine the system for themselves and they could show interested patients what the system offered. Articles in Associated Practice publications informed patients about the system. The implementation cut across the entire system. A key challenge to promotion, as more and more clinics were added to Associated Practice through the merger, meant reaching a large number of people to educate them about the benefits of CHESS.

At the beginning of the implementation, Associated Practice was the only organization using CHESS, so the developers were able to visit the organization frequently, generating enthusiasm and momentum for the project. Later, as more organizations implemented CHESS, the developers were unable to meet with Associated Practice as frequently. The project director noticed that it was harder to maintain enthusiasm and momentum when there was less contact with the founder and the developers.

Communications updating clinics and administrators on the progress of CHESS was sporadic and often anecdotal. The coordinator felt there was little follow-up with CHESS users, and that whatever feedback existed was not shared with clinics using the system.

A major problem with the promotion of CHESS at Associated Practice was the lack of sufficient champions within the organization, including at the clinic level, where there were none. Physician or nurse champions would have helped a great deal in encouraging the clinics to make referrals to the system. One Center for Health Promotion staff member who was not directly involved with the implementation mentioned that the key supporters of CHESS were "administrative physicians," and they were not able to "convince the ones who needed to use it."

The coordinator also felt that champions at all levels would have been helpful. "If I knew what I know now, I would definitely have a physician champion and a nurse champion." The few champions that did exist failed to consistently push CHESS. The director of research and analysis, a key supporter of the project, left the organization just as the implementation was beginning. The other champion, the medical director, eventually lost direct control of the department where CHESS was housed. Even when the department reported to him, however, he was not heavily involved with the project, and did not continue to advocate for CHESS. The lack of champions had a direct effect on awareness and support of the system in the organization, which is discussed further in the last section of this analysis.

### *7.6.5. Implementation Process*

The main problem with the fundamentals of the implementation itself was that the processes for identifying and referring patients presented many challenges despite a dedicated implementation staff. In reality, the processes as they were set up probably had the potential to be effective. They were simple enough, they did not burden the clinicians or staff in the clinics, and clinicians and staff generally seemed to understand the processes. However, the implementation was unable to avoid some pitfalls to the processes. The main pitfall was that clinicians did not recommend CHESS to their patients on a regular basis. This will be discussed further in the last section of this analysis.

Another reason for the recruitment problems could have been the timing of when CHESS was offered to patients. At one of the surgery clinics, when patients came out of surgery, they were given some information about CHESS to take home. If they decided they wanted to use CHESS, they could bring the forms back when they came for the post-op check. This was a difficult place to recruit because the post-op staff was already overworked, and this added to their burden.

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### LESSONS LEARNED: *Implementation Planning*

Although planning the implementation of an innovative program is difficult because by definition, an innovative program has not been tried before, it is necessary. It is often helpful to formulate a strategy for success, including short- and long-term goals, keeping in mind that the plan is likely to change over time to adapt to the realities of implementation. One Center for Health Promotion staff member felt there was not an "explicit strategy" for CHESS. He said there was no "multi-year, multi-stakeholder-type plan that was laid out to insure its success," and that successful projects tend to have more "focused, strategic thinking around the explicit intent to do well, and [he] didn't get that feeling with CHESS." Without the ability to show progress toward specific goals over time, many projects would likely flounder.

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A nurse in oncology noted that patients in her clinic were being told about CHESS at the wrong time in their care process. By the time they were through surgery and got to oncology, they had already received a great deal of information, and often did not want more. She thought it might have worked better had they been offered the system at their second visit to oncology instead of their first.

This was the first time CHESS had been implemented outside of research and personal computers were new at the time. The fact that delivery and installation in patient homes was so cumbersome was not just a problem of cost; it also meant that patients had to wait for access. One surgeon who referred patients to CHESS felt the delay hindered the effectiveness of the system in helping women. He said that in order for CHESS to be successful at Associated Practice:

> They'd have to have somebody immediately giving them the access so that they can go home and start looking at the stuff. The more they have to wait, the longer the anxiety just boils inside and they have to have something, they have to have immediate access right away.

Unfortunately, this was a problem that was not easily solved until CHESS became an Internet-based system.

In addition to these pitfalls, there was no system for implementers to receive regular feedback from users or staff. When the occasional feedback was received, it seemed that it took a long time to act on the feedback. Over the course of the implementation, few process changes were made.

### *7.6.6. Department–Technology Fit*

There were multiple problems with the new technology finding its place in the culture and landscape of the organization. The department that served as CHESS's home department at Associated Practice resulted from the merger of two other departments and it struggled to find its mission and purpose within the organization. Perhaps it was partially because of this lack of clear goals for the Center for Health Promotion, in addition to its connection with "management," that the Center did not have an especially good relationship with the clinics. The CHESS coordinator explained,

> The perception among the clinics is that we are administration and that they are clinics and it's a very "we, them" kind of thing. We had all the money; they have all the work. It was "don't ask (us) just to do one more thing because our caseloads are the same and we're getting positions cut and you're getting positions added." So, there has always been this history of administration versus clinic.

Thus the Center was held in less positive regard than the clinics.

When the Center was moved under Member Health and Marketing, it was no longer under the control of the medical director. There were no physicians involved in the Center and it had no direct relations with physicians in the organization. This was just one more reason the Center and its programs lacked credibility in the eyes of clinicians.

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#### LESSONS LEARNED: *Demand versus Supply*

At the time of the CHESS implementation, the Center for Health Promotion was taking a "supply" position, attempting to dictate what types of education programs clinics should have. That approach focused on seven clinical goals packaged as "Partners for Better Health." The Center for Health Promotion was to develop programs around these initiatives and clinic reps were to go to the clinics, attempting to "sell" the programs that had been developed. In reality, due to costs, existing programs were enhanced rather than new programs developed. The perception that the organization was spending a lot of money to develop new programs through new CHESS modules was problematic – why should the Center be funding CHESS development when they couldn't even fund other new programs that they felt were more important? This reinforced the clinics' negative view of the Center for Health Promotion as an arm of central administration that had more money than the clinics and that was trying to impose its vision of appropriate patient education, rather than assisting the clinics to provide what the clinics felt they needed. As a result, clinics often resisted using the Center's programs.

Since then, the Center has learned that a demand-based strategy is more effective. They now work only with clinics that request their services. They provide "clinic reps" that work with each clinic, receiving requests for programs. The reps bring the requests back to the Center so that they can work to develop the programs "demanded" by the clinic.

The problems with CHESS fitting into the organization went deeper than the Center's reputation among clinicians. Physician buy-in never materialized through the implementation. The system was innovative at the time in that it interactively provided patients with information and support, completely separate from their relationship with their doctors. Some physicians were not comfortable with this and considered it a threat to their provider role. A breast cancer surgeon who referred some patients to CHESS mentioned that one of his colleagues, "just didn't think it was necessary at all. It was just a waste of time, period. We gave the women all the information they needed." The director of Clinic and Community Initiatives, to whom the project director reported at the time that CHESS was terminated, had asked that providers, nurses, and care team members be interviewed about the system. Through these interviews she found that, at the time, approaches having to do with self-education and self-management were not widely accepted.

On the other hand, there were clinicians who felt that CHESS was helpful. A surgeon who referred patients to the system said:

> I think it probably helped me explain things to other patients better. By having the patients call me with questions that they had then I could anticipate questions that people had when I first saw them and then eventually you can eliminate the questions. You can answer more on the front end rather than having to answer after the fact.

Another surgeon who referred some of his patients to the system believed that women do not remember most of what is told to them when they are first diagnosed with breast cancer. "It's such an emotional time for women, especially that first visit that nothing much stays no matter what you say." He liked anything that patients could take with them to look at later.

The former director of Clinic and Community Initiatives also noted that the Center could not find a way to integrate CHESS into the care delivery model. She said that if it had been integrated, "the care provider would be aware of, involved in, and directly supportive of the person's use of the technology." Those in charge of implementation, the director felt, did not have a good understanding of the clinical setting – "the clinical process or the relationships between physicians, nurses, patients, family members." They did not understand that they were being asked to change "the medical environment of 50 years." Despite commitment by the implementation staff, the complexities of the medical environment could not be changed to the extent needed for successful implementation of CHESS.

One thing they certainly did understand was that physicians, nurses, and staff would only be able to participate in new programs if the programs did not increase their workload and were simple to implement. Clinic staff appreciated the fact that it was clear what they needed to do if they wanted to make a referral, and they knew who they could call if they had questions or problems with CHESS. Although the referral process was very easy for clinical staff, CHESS was perceived as a disruption of clinical relationships and resulted in low referrals.

### *7.6.7. Key Personnel Awareness and Support*

Many attempts were made to include clinicians to be consistent with local culture which dictated that clinicians played an important role in recommending health education. An employee of the Center for Health Promotion emphasized that this is the case for behavioral approaches in general. "With other behavioral approaches that we've used, once the physician really supports this convincingly, then the motivational level of the patient to engage is much higher."

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LESSONS LEARNED: *Culture Change –*
*Promoting Direct Access to Patients*

Relying on physicians to refer patients to CHESS in part led the Center for Health Promotion to alter the way education and support programs were delivered to patients. Knowing that clinician support was important for any patient education program, they were careful to communicate with clinicians and consider their role, but at the same time they did not allow clinicians to be the "gatekeepers." The Center found success with direct-to-member programs. What the Center preferred was "to have programs that directly connect the provider, the patient, and the program in some kind of a three-way communication dialogue," but the program has to be rolled out at the level where the support is. If there is support at the health plan level, it should be offered directly to patients, whereas if there is support at the care system level, then it should go through the physicians.

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Characteristics of the patient population itself may have also contributed to staff reluctance to recommend CHESS to patients. Associated Practice served a broad population, some of who lacked basic health insurance. In the coordinator's words, many of the patients at the Infectious Disease clinic "didn't know where their next meal was coming from." Staff was concerned about loaning computers to this population, fearing that the computers would not be returned.

The value of introducing novel innovations like CHESS through research projects lies in the chance for an institution to gain experience and understanding of the innovation before making a large commitment to its implementation. However, such research activities seldom reach the rigor of controlled clinical trials, thus the evidence they generate is more advisory than definitive. Furthermore, the principal investigators of research projects seldom possess the skills set necessary to both direct research and foster implementation. Values such as precision, statistical power, and generalizability, all important in research activities but insufficient in themselves to guide an organization's decision-making about IHC, must be complemented with anecdotal evidence of acceptability, feasibility, and compatibility.

With innovative projects such as this, it is often difficult to have hard outcomes data to show benefit. However, a Center for Health Promotion employee was pleasantly surprised at the delight expressed by some users:

> It showed me that there are ways in which you can truly delight patients. People who sort of understand it are saying, "You know, this is the best thing since sliced bread. This is a great experience. I appreciate my doc told me about this." They love the fact that it's there. They're highly satisfied, and they're just gloating, you know. I think that was, for me, a big learning (experience), just being able to see that, you can reach people with a medium like this, and, and truly make a difference.

Physicians, however, did not mention hearing these kinds of comments from patients using CHESS.

Clearly, for various reasons, the support of key opinion leaders was lacking. As CHESS was being introduced to the organization, the project staff facilitated meetings, discussions, and demonstrations in an effort to gain buy-in. Although there was no real opposition to the project and nurses liked it, there was never full commitment from the clinicians. It would have helped to have a few respected clinicians telling their colleagues that CHESS was something that would make patient education easier and more effective. However, the differences in perspectives about the goals of the system among administrators, clinicians, developers, researchers, and the implementation staff meant that support for the system also varied.

## Conclusion

This was the earliest implementation of CHESS and it provided many valuable lessons. Both the CHESS developers and the Center for Health Promotion realized that additional staff time was needed to deal with the time-consuming process of installing computers in patient homes. The challenge of maintaining currency of content in CHESS, first realized in this implementation, was addressed in subsequent implementations once CHESS was available through the Internet.

The continually evolving home department for CHESS left a tenor of instability that was mitigated by a single project director throughout the entire implementation. The Center learned that to introduce a new approach to patient education could not happen without the support of clinical staff and recognition of conflict between research and implementation. Furthermore, if a program conflicts with a long-held role of the physician in patient education, then its long-term success is unlikely.

# 8
# Union Hospital, 1993–2001

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Union Hospital is a leading regional health care institution that remained relatively stable during a period of turmoil in the health care industry. CHESS was implemented in two different medical departments, Cancer and Cardiology, with notable differences in implementation success.

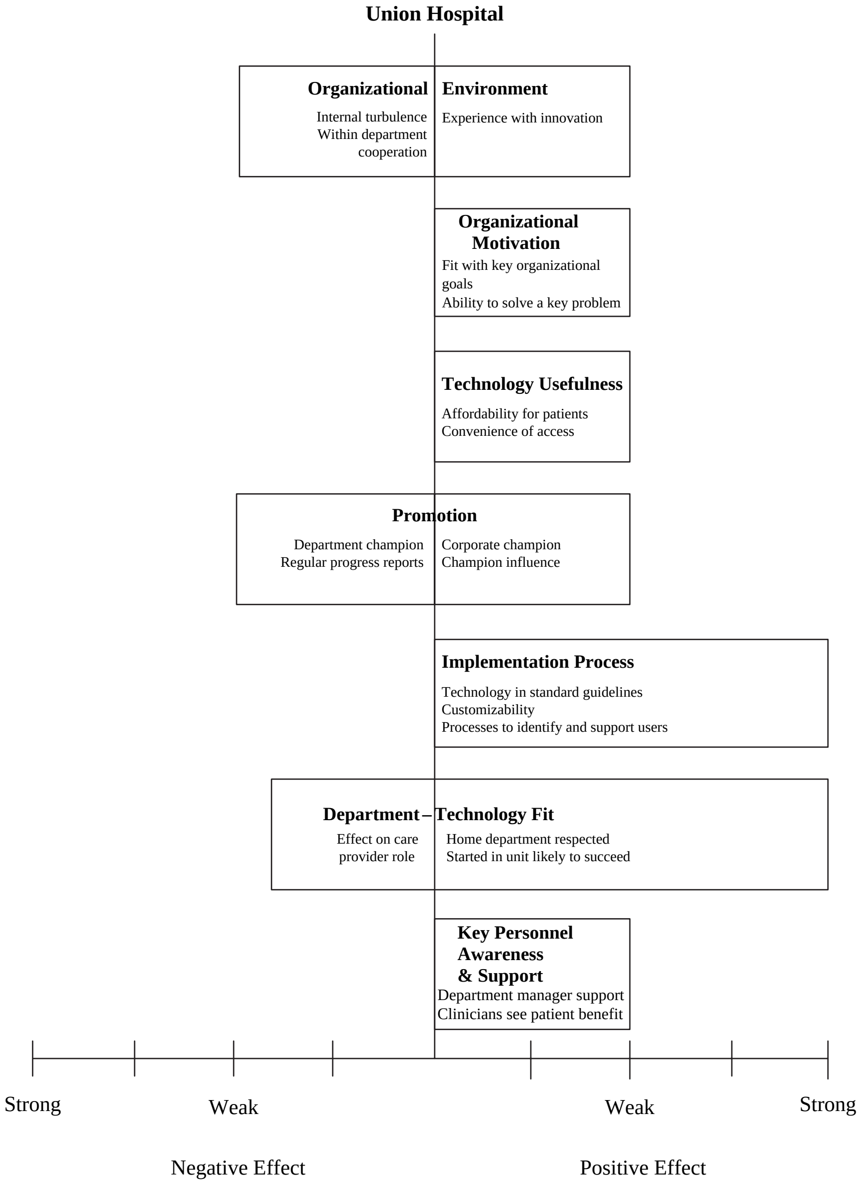
A respected, committed champion from the Cancer Center introduced CHESS to the hospital and garnered early support for its use from senior leaders. We will see in this study that the ability of the champion to secure foundation support is one of the key reasons for the differences in the Cancer Center's success, compared to that of the Cardiology Department. During the time period included in this study, implementation strategies evolved to address various barriers in an effort to offer CHESS to as many patients as possible.

## 8.1. Description of the Environment at the Site

Founded in 1854, Union Hospital is a non-profit hospital created as a private practice model. More than 800 physicians provide a wide range of surgical and medical subspecialty services at the community, secondary, and tertiary level of the 800-bed facility. Additionally, a number of services are provided in the outpatient setting. Many of the physicians have private practices in the surrounding communities. Center of Excellence programs, such as Cardiology and Cancer, include various specialties that work collaboratively to manage patients in a multi-disciplinary fashion. Research plays an important role in the hospital, with outcomes research as a hospital initiative for 10 of the key practice areas.

Union is fiscally conservative with no long-term debt. Although financially it is one of the strongest hospitals in that region of the country, there was little money for new initiatives. During the period when CHESS was being introduced and implemented, the hospital was dealing with numerous challenges, prompting one administrator to observe that the hospital was in "survival mode." Among the challenges:

- The health care environment was in a state of turmoil throughout the country. Hospitals and practitioners were under extreme pressure to reduce ever-escalating costs and to make changes in the delivery of care.



- The new federal Medicare Balanced Budget Act significantly impacted hospitals by lowering the amount of reimbursement for Medicare patients. As a result, Union Hospital began to make cutbacks and initiated a re-engineering effort in response to the Balanced Budget Act.
- While hospital patients were sicker and more difficult to care for, the nursing staff was being reduced in order to save money.

- Hospital profit margin was wiped out, so introduction of new programs was more difficult. The providers' perspective was that dollars were controlled by administrators who did not necessarily have knowledge of health care, but responded instead to political whims of the day. New ideas were solicited, but getting them implemented depended on the type of resources needed. Outside funds were almost a necessity if new projects were to be launched.

The hospital's mission statement and goals addressed these challenges in a number of ways. The hospital wanted to continue as a community leader in health care and to be perceived as being on the cutting edge of caregiving. Some of the initiatives underway at the time included projects to

- improve the quality of care;
- make care more patient-focused versus specialty-focused;
- target resources to improve patient satisfaction in areas with large patient volumes;
- strengthen relationships between physician and nursing leadership with collaborative management teams;
- decrease costs where possible;
- expand the hospital's marketshare; and
- sustain commitment to education and research.

As a leading hospital in the community, Union was expected to offer the latest advances in technology. Ironically, the hospital promoted the idea of using technology for improving patient care but provided no financial support to implement it.

The process for starting new projects was typically slow. Before a decision was made about a new initiative, time was required to build support for the idea among key players. The level of impact of the project, for example practice-wide versus hospital-wide, determined the type of key players who needed to be involved. New initiatives needed to provide monetary savings, obvious patient benefit, or goodwill in the community in order to be approved. Consequently, many new ideas frequently fell by the wayside because staff lacked the time to move a project forward. Once the decision process was completed, however, innovations that involved clinical programs were often successful due to the clinical consensus regarding the direction for the project.

Most of the physicians who practiced at the hospital were in private practice. As a result, hospital strategic goals were not necessarily priorities for them. Each physician and/or group practice made its own decisions about participation in hospital initiatives. While there was a strong collaborative culture at Union, clinical practices were often competitive when they shared competencies or the same patients. Physicians who were at least partially paid by the hospital, typically department heads, were more able to champion new projects like CHESS compared to private practice physicians who were busy trying to meet practice productivity expectations.

The priority issues for practice groups included efficiently delivering state-of-the-art care, providing patient education, and supporting patients through treatment. Patients were just starting to come in to the doctor's office with information from the Internet with the expectation that they could talk about it with their physician. The Chief of Surgery observed that the demands of a managed care environment "diverted (the physician) into surviving." Time constraints and economics (incomes were going down relative to other professions) were impacting physicians, compounding the problem of the work itself in certain specialty areas such as Oncology. These conditions created additional stress on the staff.

## 8.2. Timing of the Implementation in the History of CHESS

CHESS gained early attention from staff in the Union Hospital Cancer Program. Union Hospital was among the first organizations to implement CHESS and become members of the CHESS research consortium. At that time CHESS was a DOS-based system that integrated information, social support, and problem-solving tools to help individuals and their families cope with health concerns and to improve their health. The system was eventually changed to a secure website accessible on the Internet through a browser.

The Cancer Center group worked over the next year to gather support from key administration officials and physicians. Once the CHESS breast cancer implementation was selected as the beneficiary of the major hospital fundraiser, funding from private foundations was secured. Efforts to involve other specialties that could potentially use other CHESS modules were not fruitful except in the Cardiology Center, which got onboard with the initial pilot testing of a new CHESS Heart Disease module two years after CHESS was introduced to the organization. CHESS coordinators were hired both in the Cancer Center and in Cardiology.

## 8.3. Early Exposure and the Decision to Adopt CHESS

### *8.3.1. The Organizational Context*

The Director of Radiation Oncology and Head of Union Hospital's Cancer Center first read of CHESS in research literature. The Cancer Collaborative Management Team – consisting of the radiation oncology director, a nurse manager, and an administrator – heard the CHESS founder speak at a health care quality improvement conference. The Chief of Surgery also attended the conference with some of his staff. The principal investigator, who was also the founder of CHESS, demonstrated the module as an example of a quality improvement effort. The Union Hospital staff became interested in the possibility of using

CHESS in the Cancer Center. It appeared that this technology would meet some of the hospital initiatives underway at the time:

- the use of technology to further patient education and establish Union Hospital on the forefront of new advances;
- patient-centered care initiatives promoted through nursing leadership;
- the Cancer Program and Department of Surgery focus on breast cancer as a model of care for cancer patients;
- provide patients and their families with the information they were seeking;
- an outcomes research project to help improve education and care delivery.

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FOCUS ON: *Fit with Key Organizational Goals*

How important is it for a technology implementation to fit with key initiatives? In this case, CHESS aligned with organizational quality improvement projects. More importantly, it also aligned with a patient-centered redesign of programs, initiated by nurses and funded by grants from large charitable organizations. Initial support from key administrators was easy to obtain in this situation because there were so many ways the technology fit with other projects. Because the hospital had a strong research focus, administrators and clinicians appreciated that CHESS was developed in a research context. The CHESS implementation also met the hospital requirement for departments to complete outcomes-based research. In the case of the implementation of CHESS at Union Hospital, the fit with key initiatives was crucial to the success of the project.

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The group that had attended the health care quality improvement conference brought the idea of using the CHESS breast cancer module back to Union Hospital as an idea for the Cancer Collaborative Management Team's outcomes-based research project. The Chief of Surgery was also interested in integrating this module into the initial breast cancer patient management plan. It was fortunate that he was the Chief of Surgery at this time since his practice included many breast cancer patients and he had a natural interest in a system like CHESS.

The fact that CHESS was developed in a research context was an important factor in Union Hospital staff's interest. Hospital staff felt the module was more credible since its effects had been previously studied, articles had been published, and it was developed based on patient needs assessments. Union Hospital was interested in the opportunity to collaborate on research projects and in the development of other modules with the CHESS university-based developers as well as other research consortium members.

CHESS also fit into the nursing department's patient-centered initiative and addressed the needs that breast cancer patients had previously raised. Some also saw the module as a way to provide better service to a population that was not currently being served well. They especially liked the idea that Union Hospital would be the only hospital in the area offering this module. Since outside funding was essential for the introduction of any new projects at the hospital, the physician champion thought CHESS would be potentially attractive to donors.

A practitioner respected throughout the hospital emerged as the key champion for CHESS and identified key stakeholders that needed to be involved early in the decision-making process. The group included the Director of the Medical Libraries, Director of Clinical Research, Manager of Information Systems for the Cancer Program, Vice President for Fund Development, and the Director of Outcomes Research. This work group, along with the initial group of people who heard about CHESS, worked on building internal support for the breast cancer module. Progress was regularly communicated to key individuals at the hospital. To generate more interest the CHESS founder was invited to the hospital to demonstrate the module. As anticipated, it helped bring on more supporters, and eventually the hospital joined the CHESS research consortium.

An informal proposal was put together and sent to senior administration. The Executive Vice President and Vice President of Medical Affairs championed the module at the Management Council. This was a typical decision-making process in this organization. The Management Council would look at an opportunity and make a consensus decision as to whether to pursue it. Staff members who would be impacted by the decision might then be asked for their opinion. If enough people felt strongly against it, the leadership group would reconsider its decision.

The Management Council liked the CHESS project but had concerns about funding sources, amount of resources required for implementation, and whether patients would use the module. They understood the module would contribute to the quality of care by empowering patients and increasing patient satisfaction, but it would not save the hospital money. In terms of priorities, there were other projects that the hospital needed to fund immediately, such as a new building or a piece of equipment. Hope for CHESS was not lost, however. Senior management echoed the physician champion's sense that CHESS would be attractive to donors.

The decision to use the CHESS breast cancer module at Union Hospital was a slow consensus-building process. It took over two years to get the module approved for use in the Cancer Center. Sustaining interest for the project was difficult because people mistakenly sensed it was never really going to happen. Additionally, there were concerns that the technology would be outdated by the time the module was finally ready for use. While some individuals remained supportive through this period, the project shifted to lower visibility and importance for others.

The work group was asked to put together a business plan on how the breast cancer module would be funded and implemented. Recognizing that this type of resource would take time to become established, the physician champion recommended that sufficient funds be raised for a three-year implementation.

The work group began efforts to raise money and was successful in receiving funds from several family foundations. The project received a big boost when CHESS was designated as the recipient of funds from the hospital's major annual fundraiser.

FOCUS ON: *Adequate Resources for Implementation*

Organizations often fail to sufficiently fund new technologies for the length of time required for successful implementation. In this case the physician champion recognized the need and made sure that at least three years of funding was secured prior to beginning the implementation. Private funding from the hospital foundation and outside foundations was relatively easy to obtain since the technology was viewed as innovative and helping to address the needs of cancer patients, where funds were more readily available.

### *8.3.2. Expansion Beyond the Cancer Center*

Subsequently, the Management Council indicated interest in a broader use of CHESS in the organization and a larger more formalized steering committee was assembled. Surgeons, oncologists, nursing leaders, and information services joined with the informal work group to further develop support for the module throughout the hospital and to approach implementation from a multi-disciplinary outlook. Some effort was made to connect with other departments who might use CHESS modules already available for other specific diseases like HIV. Other departments were approached who worked with patient populations that might benefit from this type of patient education, such as asthma, with the hopes that the department might be interested in participating in the development of a new CHESS module. However, the resource commitment to implement and sustain CHESS is high which makes it difficult for individual departments to come onboard.

Over the next few years, the physician champion successfully pursued the development of a CHESS prostate cancer module following completion of a needs assessment research project with the CHESS developers. The champion felt that CHESS could be a wonderful resource for other departments and that the financial commitment made by the Cancer Center could be leveraged to help acquire the module for other areas at a relatively reduced cost. He believed that the more areas that used the module, the greater chances for its long-term future at the hospital.

Cardiology was the only other area that expressed interest in using CHESS. Early on Cardiology agreed to be part of the development of a new CHESS module on heart disease. This department participated in the initial needs assessment prior to development and in the randomized pilot of the first version with patients at Union Hospital.

Meanwhile, staff in the Infectious Diseases Department reviewed the HIV module and appraised it as not directly relevant for the population they served.

Concurrently, the physician champion discussed the CHESS asthma and children of alcoholics modules with his colleagues in the appropriate fields but received no commitments. Union Hospital staff did help early on in the development of the asthma module by doing a needs assessment with its asthma patients. The collaboration on development, however, did not continue because their patient population necessitated that the asthma CHESS module be in Spanish, which was not available from the developer.

## 8.4. Implementation of the Breast Cancer Module

### *8.4.1. Gaining Staff Support*

A full-time coordinator for the breast cancer module implementation was hired after funding had been secured for at least 3 years. The individual was a Nephrology nurse and a breast cancer survivor herself who was interested in expanding to more administrative work. She had previously worked with many of the surgical practices during her work as a clinical nurse and was well connected throughout the hospital. In June, she met with the developers for an orientation to the module and implementation strategies.

CHESS was physically housed in the Cancer Center. Technical pieces for CHESS were put into place with the assistance of the Information Services Department, which also assisted in the purchase of computers. Marketing and other support materials were developed. Various areas in the hospital, both inpatient and outpatient services that worked with breast cancer patients, were targeted to inform about the module and encouraged to make referrals. The coordinator, with occasional help from the physician champion, spent time marketing CHESS to these areas and other affected groups.

The goals for CHESS were shared with the targeted areas. These goals were to

- provide breast cancer patients with a source of information, support, and decision-making tools to use in their homes;
- study whether re-introduction of CHESS after 6 months would have any benefit;
- utilize the module as a data gathering system in order to discover other areas for research.

The hospital's Research Committee approved a proposal to do a research study on the CHESS breast cancer module. The study focused on identifying the resources that patients use and how they prioritize the module as a form of support. The purpose of the study was to provide support for the implementation of CHESS at Union Hospital and to develop an initial data set for outcomes research. Also, this study aimed to test the hypothesis that a re-introduction of the module 6 months after a patient's diagnosis would be of value in improving outcomes. Comparisons would be made in functional health status, quality of life, and satisfaction with health services.

The steering committee that had worked together to push the adoption of CHESS was disbanded. The initial work group's enthusiasm and time for the breast cancer project diminished, particularly once the CHESS coordinator was onboard. Newer projects took priority and the system seemed to be well on its way. The Cancer Advisory Group, which served as a coordinating group for the various practice areas working with cancer patients, was informed about the project but was not asked to approve it. By the time they heard about CHESS, funding had already been secured.

As was typical with other decisions in the Cancer Center, the physicians had not been a part of the initial decision to use the module. Although decision-making to use the module was a slow process and included people at various levels, certain groups still felt left out of the process and felt that they had no real input. Each physician, however, made the decision whether to personally use CHESS in his or her practice.

FOCUS ON: *Department Champions in Practice Groups*

Although a strong corporate champion existed in the Cancer Center, champions for CHESS were lacking in the individual practice groups. A project being a hospital initiative or even a Cancer Center initiative was not enough to move it forward because of the practice environment at Union Hospital. Individual physicians might have been more willing to use CHESS if a peer in their own practice group had championed its benefits. The importance of a practice group was demonstrated at one clinic where the nurse manager took responsibility for assuring that each breast cancer patient would be told about CHESS. In this practice, a system was set in place so that clinical staff followed through on this step.

### *8.4.2. Research Project*

CHESS was promoted as a research study, making the project more attractive to hospital staff. Demonstrations and brochures were used as the primary marketing tools. Computers were set up in some of the surgical areas primarily for nurses and physicians to try out the module. A surprising number in this group, however, never went through the module or saw a demonstration of its use.

Many of the cancer surgeons were wary of CHESS because they were concerned about their patients receiving information from a source other than themselves. They were concerned about the accuracy and balance of information presented in CHESS, for example whether one type of treatment would be favored over another. Comments ranged from "I'll refer all of my patients" to "I want to be the main source of information for my patients." Other physicians, however, said if it was fine for the physician champion, it was fine for them.

Not all were clear about the goals of the implementation or their role in the process. Some nurses suggested that additional efforts to secure their buy-in to the implementation of CHESS could have been made. Significantly, the passionate advocacy of CHESS by the coordinator and nurse manager was not well received in all areas and proved to be a barrier for some physicians' acceptance.

The first installations of the breast cancer module in patients' homes began with the DOS-based version of CHESS, which at that time required considerable resources for setup and training. The targeted patients were women early in their diagnosis of cancer. Focus was limited partly because of concerns about how many resources would be needed to provide support for users. This limitation remained in place throughout the first period of implementation when the module was DOS based. When the Internet version became available some of the resource issues lessened, though new technical issues arose requiring support from staff and the CHESS developers.

The referral process initially relied on physicians, primarily surgeons, to refer breast cancer patients to the module. The goal was to offer CHESS to patients shortly after diagnosis and before they made a decision about treatment. Most physicians were not opposed to the module in theory, but many of them did not offer it. Some physicians were under the impression that all of their patients were offered CHESS by either the nurse or office staff, even when that was not the case.

In general the practices that used CHESS found it easy to make a referral. Names of interested patients were given to the CHESS coordinator in a variety of ways: the physician or the nurse would call with the names of the interested patients' names, patient information was faxed, or patients called the coordinator. Health care staff acknowledged making judgements about who would use or benefit from the module based on age, anxiety level, language barrier, or if the patient already had a high knowledge level about the disease.

One of the recruitment barriers was related to patient confidentiality. The coordinator made the effort to learn the names of newly diagnosed patients as soon as possible. She suggested that the pathology reports be passed on to her and she would make the initial contact with the patient. However, physicians were concerned about releasing names without the patient's consent. Additionally, some of the initial screening (literacy, language, etc.) would not have been done.

### FOCUS ON: *Cooperation between Departments*

Tension and/or competition between practice groups hindered the referral process in some cases. Each practice had its own approach to patient education and some people felt the Cancer Center was trying to take over this function by promoting the use of CHESS. One practitioner suggested that the patient should get the module directly from the physician's office versus having the patient go through another step, that is the CHESS coordinator. Physicians were also concerned about losing patients to another specialty. Surgeons felt that the Cancer Center had more money and it was easier for them to do other programs. This same feeling about the Cancer Center arose when cardiology decided to use the CHESS heart disease module.

In some cases the referral process worked smoothly, such as at a surgery clinic in a nearby community that saw breast cancer patients both pre- and post-biopsy. The success of referrals at this clinic is noteworthy because, ironically, the same physicians practiced in the hospital but were not referring patients from their hospital-based clinic.

A key difference appears to be that the nurse manager at this clinic took on the responsibility for implementing CHESS and the entire clinic staff "bought-in" to the module. She considered the physicians and herself to be the champions of the module at that clinic. All of the nurses or medical assistants were responsible for telling newly diagnosed patients about the module. If a patient was interested, her referral would be faxed to the CHESS coordinator. Later the process was made even simpler for staff when the referral could be phoned in to the coordinator.

Communication about CHESS and study results occurred intermittently via various methods, and physicians varied in their interest in receiving follow-up about patients who used the module. Most did not think about it again once the patient was referred; it was just a small part of their work with patients. But clinical staff indicated interest in receiving more general updates about CHESS and its progress at Union Hospital. People had heard a great deal about the module when it was first implemented, but were not as aware of its status later on in the implementation.

A new CHESS coordinator was hired two years into the project, a medical/surgical nurse who had experience on one of the surgical floors in the hospital. She continued the efforts of the first coordinator in addition to seeking new sources of referral including patient self-referral.

A study examining the patterns and duration of the use of CHESS also began. The goal of the study was to discover the optimal length for a woman to have access to CHESS. The module had become an established service offered to this patient population, and staff was interested in determining how long it would be beneficial to have women use the module.

The CHESS coordinator continued to work on improving the referral process and raising awareness of CHESS. The perception of clinical staff, however, was that communication efforts related to CHESS were reduced. Several people indicated that they had not heard anything recently about the module. Others assumed that all their patients were being told about CHESS, even when that was not the case. Bringing CHESS back to the forefront of people's attention was not easy, given the increase in use of the Internet by patients for health care information.

Both clinical and administrative staff expressed concern with the low enrollment. The hospital had about 300 new breast cancer patients each year and about 30 percent of those women used CHESS. Cancer Center staff was concerned that more patients were not taking advantage of CHESS or using the module when they had it.

## 8.5. Analysis of the Breast Cancer Module Implementation

The implementation of the CHESS breast cancer module at Union Hospital provides a useful illustration of the seven factors in the model presented in Chapter 5, Implementation Model Development and Testing.

### *8.5.1. Organizational Environment*

The environment for the implementation of CHESS at Union Hospital was not particularly favorable, but it did not present major barriers either. Organizational leadership generally supported innovations in patient care and new technologies. Staff was familiar with other innovations or ideas that had been implemented, both failures and successes. As in most other health care organizations at that time, turbulence in various forms was commonplace. There were financial difficulties, staff turnover, changes in organizational structure, and sicker patients requiring more staff time. The financial impact of changes in Medicare reimbursement seemed especially burdensome for the hospital, making it difficult to fund new projects. Nursing staff was being cut back, which impacted introduction of new projects like CHESS that relied on nursing involvement.

LESSONS LEARNED

Existing relationships between clinical areas influence an implementation. A history of mistrust presents barriers to broad-based dissemination. When there is no culture of inter-departmental cooperation, institutions that have found an acceptable technology approach to meeting organizational goals must develop innovative incentive strategies.

Clinical staff commented that cooperation among departments and practices was non-existent. There was long-standing mistrust and competition between departments that hindered the cooperation that is critical in projects such as CHESS that reach across specialties.

### *8.5.2. Organizational Motivation*

The fact that CHESS aligned well with Union Hospital's existing initiatives and goals provided significant motivation to implement the breast cancer module. The hospital was working to become more patient-centered versus specialty-focused and to distinguish itself in the market by leading in the use of innovative programs. CHESS was seen as helping to further these goals by improving the quality of the patient's experience using "cutting edge" technology to deliver information and support. It also provided an opportunity to participate in research, which was important to organizational leaders. Patients also expected information and support from their health care provider to help them make health care decisions.

As the Internet grew and became more popular, patients came to their providers with material they found on the Internet that varied in accuracy and quality. Eventually, some patients began to request CHESS because they heard from other patients that it was a high-quality resource.

Since the implementation would require significant resources, there was a lengthy approval process that had to be followed. This process was a barrier to the project, but the initial group of CHESS supporters successfully navigated through it to obtain approval. Senior managers were supportive of efforts to improve patient education although they were unable to provide resources or make the project a major hospital initiative.

CHESS was not high on the organization's priority list, especially when compared to other needs such as new equipment. Consequently, innovators had to find the resources themselves to pay for new projects. A new approach to patient care, such as CHESS, was more likely to receive outside funding, and the fact that it was a cancer project made support from private foundations more readily available than for other types of programs.

The Union project received money early on from the hospital fundraiser as well as money for outcomes research from the hospital's endowment fund. The physician champion pushed to secure private support to cover three years of operations because he recognized that an innovation such as CHESS had to be given enough time to succeed. This allowed the CHESS breast cancer module to have the benefit of a full-time coordinator.

From the beginning, hospital leadership had questions about how to sustain CHESS beyond the research project. The Cancer Center agreed that costs of implementing the module were high, but they were hopeful that the cost of sustaining the technology would lessen as time went on. Unfortunately, this was not the case. CHESS continued to cost more to implement than originally anticipated, and fewer people used the module than had been expected.

One problem was that technology was "delivered" via membership in the research consortium or participation in research studies. Consortium fees were high and there was a feeling that too little of the money was spent maintaining CHESS. Also, it was not always clear to implementers at Union Hospital how collaboration in the consortium worked or how the organization would benefit.

### *8.5.3. Technology Usefulness*

Generally, implementers of CHESS and clinical staff in the Cancer Center felt that the module met the needs of users. The most attractive feature of the module was that patients could access it at any time of the day or night and receive information and support when they most needed it. Although clinics were unable to provide immediate access and had to refer the patient to another office, the coordinators were able to respond to patient requests within 24 hours and were moving toward online self-registration.

Clinical staff appreciated the development process of the technology, which relied on patient needs assessment and research results, as well as the fact that research studies had demonstrated the benefits of CHESS for patients. They appreciated the anonymous “Ask an Expert” feature and the protection of patient confidentiality through the use of individual code names and passwords. Staff felt that CHESS must maintain its quality information and support through regular updating and translation to other languages, but the translation did not occur.

Encouragement and support from the CHESS coordinator was important to users and clinical staff, and they felt that help was readily available if problems arose. The developer provided ongoing technical support and the CHESS coordinators responded to local concerns.

Approximately 30 percent of breast cancer patients used CHESS. This was a good number compared to other implementations of CHESS at Union Hospital and other organizations’ implementations of the breast cancer module. Nevertheless, the implementation team had hoped for higher usage rates.

### *8.5.4. Promotion*

Marketing efforts got off to a good start. The technology was introduced to staff through articles, presentations, demonstrations of the module, and daily visits on the units by the CHESS coordinator. Clinical staff attending the presentations were expected to go back and tell others within the department about the project. A variety of marketing approaches were used in order to distinguish CHESS from everything else in front of the clinical staff.

> LESSONS LEARNED
>
> It is critical to communicate results of how the IHCS (interactive health communication system) is used – what has happened with the IHCS at your organization and what the outcomes of use are. Individual physicians, nurses, and administrators varied regarding how much feedback they want about CHESS and about their patients’ experience using it.

It was necessary to work with a network of people to get the word out about the technology and to maintain a high level of visibility. CHESS was advertised to patients primarily through brochures in clinic areas. However, widespread marketing directly to patients was difficult to do. Access to the CHESS module was limited because of either the requirements of the research study or the fact that CHESS users needed to receive their care at the hospital.

The presence of a well-respected physician who could champion CHESS at the corporate level was a key factor in the success of the implementation. He took responsibility for pushing the technology forward, including securing funding for the project, and overcame some political barriers. He was aware of clinical staff needs and potential concerns about the technology that would need to be addressed during implementation.

The physician champion's active support of the breast cancer module aided the visibility and long-term viability of the module. At the department level, physicians expressed their support of the module, but only one clinic nurse manager stepped forward to really push for its use. Additionally, the Chief of Surgery was particularly helpful in promoting the module at surgical department meetings, but was never viewed as a champion for CHESS. In fact, he never promoted it to his own patients. When later a new Chief of Surgery replaced him, his influence diminished. Having additional physician champions in each clinical practice would have facilitated increased referral of patients to the module.

One of the challenges for the implementation staff was to find the best way to share feedback with providers about the experience of CHESS. A system was already in place to report research results to key administrative and senior managers since each collaborative management team at the hospital was expected to undertake at least one outcome-based study. Implementation staff had talked about going back to departments and reporting research results, but it never happened. Some communication occurred with clinical staff and managers via newsletters and letters, but some heard an initial presentation and nothing more. The project initially had the support of a good mix of people in the organization, but failure to keep up communication with this group meant that their enthusiasm and involved support were lost.

### *8.5.5. Implementation Process*

Staff had varying ideas on the best way to refer patients, such as including CHESS as part of practice guidelines, having the office staff make the referrals, and marketing CHESS directly to patients. Some clinicians felt that the office staff could tell the patient about CHESS, while others thought doctors needed to encourage its use. The CHESS coordinators found that it was best for patients and staff if there were multiple referral mechanisms, although that meant more work for them.

The coordinators were experienced nurse managers, familiar with organizational systems and the surgeons. They did a good job of setting up processes and systems, and connecting with various groups throughout the hospital, making it as easy as possible for patients to be referred to the module.

Some clinical staff took on the technology as part of their job and most of the staff were encouraging if patients asked about the technology. In fact, CHESS for breast cancer patients was fully integrated into clinical practice. Physicians from Surgery, Radiation/Oncology, Medical/Oncology, Hematology/Oncology, and in-patient units referred women to the module as part of their standards of care.

The referral process through the provider was generally felt to be the most effective, but it had problems, too. Some physicians and other clinical staff were biased about who would use the module. Clinical staff was often too busy to remember to tell patients about it. Even if they remembered, the timing was not necessarily right. For example, some users received the module after they made a treatment decision when it would have been more useful to them beforehand. Other users would have preferred to receive CHESS at a later time.

Additionally, the fact that CHESS was a research project created a burden for clinical staff when recruiting patients. It was sometimes difficult to identify patients to use the module because of confidentiality issues and it was difficult to determine who would be eligible for the study and who would not. This was partially offset by the fact that cancer patients are frequently interested in participating in research studies, particularly if they feel it will benefit subsequent patients.

The presence, or absence, of support from the CHESS founder made a difference. The CHESS developers were a valuable resource for planning the implementation, particularly for breast cancer. The champion in the Cancer Center would have appreciated more direction from the developers on spreading the technology to other departments within the hospital.

Training for staff was addressed through presentations, one-on-one demonstrations, and written materials. Demonstrations of the technology and the placement of computers in departments were part of the effort to build support and train staff. Not all of the front-line staff, however, was adequately informed about the project. In fact, some were misinformed about recruitment practices and that it was their role to refer patients. Few on staff actually tried the technology themselves. Clearer communication to all affected staff was necessary to define roles and responsibilities for the project. Consistent messages about module benefits and goals would also have been beneficial.

Although various kinds of data and anecdotal information from users of CHESS were being collected and analyzed, it seemed that very little of this information was being effectively communicated to those who were part of the process. Since the feedback was not shared, it could not be acted upon to improve CHESS or the processes used to implement it, although at one point used data inspired the CHESS coordinator to work on new approaches to increase the number of users.

### *8.5.6. Department–Technology Fit*

CHESS was housed in the multi-specialty Cancer Center, but many perceived that it belonged to Radiation Oncology because that was the physician champion's department. Unfortunately this caused some negative feelings toward the module because Surgery viewed the Oncology Center as "wealthier" and felt they were being asked to do the same work without equal resources. Some surgeons believed the oncologists had an elitist attitude – that they knew what was best for the patient and would take care of it. The physician champion worked to combat these attitudes by using a consensus decision-making process among colleagues from different areas.

Computers were set up in some of the surgical areas so that clinical staff could try out the breast cancer module, which was important particularly when the system was DOS based. Many on the clinical staff, however, were not very familiar with computers or the Internet when CHESS moved to that medium. Several physicians made the assumption that since they were unfamiliar with these technologies, their patients would be too. Some clinical staff members were described as being suspicious of new ideas. Some even saw CHESS as threatening their care provider role, even though research data showed that CHESS did not replace the patient education role of the physician.

CHESS was a small part of patient care in the clinic and had to compete with other research studies, programs, and treatment issues. When doctors would view the system as part of their patient treatment plan, rather than a hospital initiative or research project, success was more evident. The implementation team recognized that CHESS needed to fit into existing systems to make it as easy as possible for clinical staff to tell patients about the module.

The initial delivery method was cumbersome, but this improved once the Internet version of CHESS was available because it was no longer necessary to install the module on individual computers. Technical difficulties meant extra work for the clinic and implementation staff. They did not feel that these technical issues were outside the norm of any computer-based system, but they did expect improvement.

### *8.5.7. Key Personnel Awareness and Support*

The physician champion and other early CHESS supporters did a good job of bringing in key stakeholders in the initial stage so that senior leadership got behind the project fairly early to secure approval and funding. An informal work group was organized that included a variety of managers and physicians. Opinion leaders and managers saw CHESS as being on the forefront of how patient education would be delivered in the future, but the support of these opinion leaders lessened as time went on.

Some physicians who had been brought onboard during the early stages lost interest during the time it took to get the project going. Also, some department managers who were key supporters in introducing the technology left those positions, leaving gaps in the support for the module. The Cancer Center champion felt that in hindsight the initial steering committee should have remained active to help in the overall planning and direction of the CHESS implementation at Union Hospital. It may have helped to sustain some of the early interest in the project, guided or facilitated communication to various internal constituents, and provided advice on research opportunities.

Most of the clinical staff did not find out about CHESS until after the decision had been made by the Cancer Center to use it. A few practices embraced it wholeheartedly, while others were supportive only in word, not action, or did not see a role for it in their practice. Still others had concerns, especially early in the implementation, about whether patients would feel comfortable using a computer-based system. Because of their concerns clinicians offered it only to those they felt would be most likely to use it. This meant that some potential users were never told about the technology. Fortunately, there were enough clinicians encouraging their patients to use CHESS to make the project successful. A major barrier to physician involvement, however, was that in a private practice environment a physician needed to focus on his or her practice, rather than implementing a hospital initiative. The implementation team tried to address the challenge of physician acceptance in a variety of ways, but did not get as many physicians onboard as they hoped.

The outcomes data on breast cancer patients using CHESS was very strong. CHESS was important to patients for getting questions answered, getting information about surgery, other treatments, making decisions, and helping with coping skills. It affected overall satisfaction with care “quite a bit” and “very much” for 64 percent of users who completed surveys. The module was shown to be comparable to health care providers as a source of information, and also to family and friends as a source of support. The results from the first research study were helpful once they were finally available because they demonstrated to clinicians that their role was not supplanted by CHESS. It was even more credible to them because it came from Union Hospital patients. Additionally, there was much anecdotal evidence of benefits for breast cancer patients and their families. One physician felt his interactions with patients were improved when they used CHESS, although some users reported a negative experience with the module. More work was needed to assess and communicate patient satisfaction with CHESS compared to other patient care services, as well as benefits of the module for patients, physicians, clinical practice, and the hospital. Providing more concrete data would have helped alleviate physician concerns about the module.

## 8.6. Implementation of the Heart Disease Module

After the breast cancer module had been used for a few years, the CHESS physician champion from the Cancer Center approached the Cardiology Chief about becoming involved in the development of a new CHESS module on heart disease. The Chief was receptive to the idea, but did not become actively involved in the project himself. The Research Manager in Preventive Cardiology stepped in and became the champion for the project. She valued its fit with the clinical routines and post-discharge care of patients in preventive cardiology. She was also personally interested in participating in the research development efforts with the university-based developers. The plan from the beginning was to implement CHESS as a patient service. The initial research would help shape how the module would be delivered as part of regular clinical care. The CHESS Breast Cancer coordinator shared information with cardiology, especially related to how the module was delivered to the breast cancer patients.

The cardiology group was a Center of Excellence at Union Hospital that provided primarily referral services for a large geographic area and included both preventive and therapeutic cardiology services. There were 21 physicians and 15 fellows practicing in this group as private physicians. Nurses were involved in patient care services both with patients and in community-based health promotion events. The cardiology staff recruited for many research projects, primarily drug trials. It was anticipated that a CHESS research project would be different and perhaps easier for physicians to accept since it was not a drug intervention. Implementing any new project in cardiology was difficult primarily because of existing demands on nursing staff.

The decision to use CHESS was similar to how other decisions were made within that department – through the collaborative management team of physicians and nurses. The primary attraction of using the module was that research would result from the association with the developers. Another motivation was that CHESS would portray Union Hospital as being on the cutting edge with new technology compared to the other hospital in town. The hospital's Executive Vice President encouraged participation in the project, viewing CHESS as a natural extension of patient education. The successful use of the module in Oncology also had some influence on its acceptance in Cardiology. The culture had changed enough in relation to the use of computers so there were fewer concerns about a patient's acceptance of this module in contrast to when the breast cancer module was first introduced.

The Division of Cardiology agreed to participate in a pilot test of the new CHESS heart disease module. Research was a priority for the department and they welcomed the opportunity to participate. The Research Manager champion had good working relationships with the cardiologists and was able to get them onboard for the pilot. However, none of the physicians had additional time to participate in the content development or recruitment of patients.

The cardiology project champion coordinated the pilot, which involved 12 patients randomized to either receive CHESS or print educational materials. Participants were recruited in the same manner as for a medication trial; patients who went to the cardiac catheterization lab received a letter about the study. This approach was not very effective for recruitment for this pilot. Once people were recruited, however, everything proceeded smoothly. Cardiology staff felt that the hospital setting was the best place to implement CHESS since people were most motivated to make behavioral changes right after a cardiac event. This was similar to the experience of the other sites that had tried out the new heart disease module.

After the completion of the initial pilot, the project champion liked CHESS enough to continue implementation efforts. The module itself was not controversial, but implementation required substantial resources. The costs of the module were, and continued to be, the real issue. The project champion secured additional funding for CHESS and other heart education projects from the major hospital fundraiser. The Vice President of Fund Development was a key supporter of the project because of her earlier experiences with CHESS for breast cancer.

A half-time CHESS coordinator was hired to set up the initial rollout of the module prior to a larger effort. The remainder of her time was spent on other behavioral medicine projects in the cardiology department. She was familiar with the various cardiology units and staff because of her previous work on the department's smoking cessation programs. The new coordinator spent time developing a referral system and connecting with nurses about the availability of the module. She worked on a proposal for funding of a study to look at the impact of CHESS on cardiac patients and depression. The submission of this funding request was delayed for a year because another cardiology project had a higher departmental priority to receive funding. The CHESS study was eventually funded and recruitment was scheduled to begin.

Just before recruitment began, the Research Manager champion left the hospital to relocate to another part of the country. Continued use of the heart disease module was in doubt; funding was uncertain and usage was minimal. The Director of Behavioral Health Programs took on the responsibility for CHESS and supervision of the CHESS coordinator. She was interested in the research aspects of the module, but felt that integrating its use into clinical practice would be difficult.

Trying to figure out the most effective recruitment approach took some time. The CHESS coordinator made presentations to Cardiology staff at in-service meetings. No doctors attended these sessions, but the nurses were interested because the module corresponded with the self-care approach of preventive cardiology, and provided patients with support at home. The reactions to CHESS ranged from neutral to positive. Physicians did not have a problem with their patients using it, but were not active in making referrals. Initially the coordinator met with every new nurse to tell him or her about CHESS, but eventually this no longer occurred because of increased demands on nurses' time.

The heart disease CHESS coordinator worked with the nurses to encourage them to refer hospitalized patients by using a simple referral process similar to the one already established for smoking cessation. Staff could leave a message for her and she would visit with the patient about the module. In addition, CHESS was added as an option to an already existing form, which listed behavioral medicine programs available for cardiac patients. Brochures were also available for patients to pick up in the offices and initially most of the referrals came directly from the patients. The coordinator also explored the possibility of offering the module with nurses in Cardiac Rehab. In addition, the Cardiology Center purchased laptops to loan to participants in the study.

The CHESS coordinator stressed the necessity of continual marketing, which was difficult given the time constraints of her job. She initially used the materials from the implementation of the breast cancer module, which made marketing difficult at the beginning because the patient populations are so different. Eventually, she secured funding for the production of a CHESS heart disease recruitment video. Production of the video took a great deal of the coordinator's time for the next year but, eventually, the video proved to be a good recruiting tool.

During the first year of recruitment for the heart disease module, few patients used it even though the module was available to anyone who was interested. Most of the coordinator's time was spent on the development of recruitment tools and processes, leaving little time for actually recruiting patients. Furthermore, people who did use CHESS were not overwhelming in their support. If some of the initial users had been more positive, it would have paved the way for the next phase of the implementation. Additionally, since front-line cardiology staff rarely saw the patients again, they did not have the opportunity to hear from the patients themselves about positive benefits of the module. Supporters of the module also wondered about the timing for offering CHESS. They felt that the module would be most beneficial for a patient right after a cardiac event when their motivation to change lifestyle was high. How to recruit hospital patients, however, was not clear.

The Director felt that developer support for their implementation was lacking at times. A greater level of technical support and regular communication about research plans in the works would have been helpful, she noted. She said, too, that CHESS was unlike other software in that it did not come with a step-by-step implementation handbook and the module itself was still in development. The trade-off was being able to participate in research and provide a value-added service to patients. It was not always clear, however, when discussions with the developer were "just brainstorming for new ideas" versus committing support of a research idea. Furthermore, the developer's efforts to keep the heart disease module updated were limited since it was not heavily used across the CHESS research consortium. That was a disappointment to the Director who thought that some of the consortium fees they paid should have gone toward maintenance of the module.

### FOCUS ON: *Promotion*

Collaboration between the department using the breast cancer module and the department using the heart disease module was limited. Their primary joint effort was to work with the Information Services Department to negotiate access to Web-based CHESS via the hospital's server. Some of the recruitment materials were shared as well, including a recruitment video describing both CHESS modules in use at Union Hospital. But the two modules really operated independently. The developers of the technology assumed a greater amount of communication between the two modules than existed in reality. At times this meant that the cardiology group was unaware of research activities being considered by the developer who tended to communicate more frequently with the breast cancer staff. The initial CHESS coordinator in the Cancer Center had hoped to act as a central coordinator for the module in the hospital, but nothing formal was ever established. Both departments would potentially have benefited by working together on CHESS research, building an infrastructure to maintain the module, and coordinating efforts with the developers.

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The heart disease CHESS coordinator left her position and a graduate student took over recruitment and revised the recruitment approach. He showed the CHESS recruitment videotape to six or seven patients within a few hours. Response was positive and study participation grew steadily.

Because of study design, the only CHESS users were myocardial infarction (MI) patients. The plans were to then offer the module to all cardiac patients in the hospital. Although patient satisfaction with CHESS was strong, the cost per patient to run the module was high. The question remains whether patients might have been equally satisfied with something less costly (e.g., a list of good websites). Funding for CHESS was always an issue in the Cardiology Department.

Still, no physician had stepped forward as a champion for the module. The new Cardiology Chief, however, was supportive of CHESS and similar programs. In general the module had the support of the Cardiology Department, and staff was enthusiastic about continued research efforts in conjunction with the CHESS developers. Once again, funding had to be secured in order to keep the module going. The Director felt that a high level of patient use would be proof of patient satisfaction, without such evidence the module could not be sustained.

## 8.7. Analysis of the Heart Disease Module Implementation

The implementation of the heart disease module at Union Hospital illustrates a different implementation experience within the same institution. These differences will be discussed using the framework of the seven factors in the model presented in Chapter 5, Implementation Model Development and Testing.

### *8.7.1. Organizational Environment*

The factors in the organizational environment that affected the implementation of CHESS for breast cancer also had an impact on the heart disease module's implementation, since they were implemented in close succession. Attitudes toward innovation were favorable. It should also be noted that the Cancer Center's successful experience with CHESS influenced the Cardiology Center's decision to try the technology.

### *8.7.2. Organizational Motivation*

The research focus of CHESS was a major motivation for its implementation in cardiology. The Chief of Cardiology and the Cardiology Nurse Manager both found this research focus appealing, and provided the push to get the project going in that department. The resources required to implement CHESS in cardiology were covered by research funds and restricted grants from the hospital endowment fund.

From the cardiology perspective, new interesting studies were needed to keep the module going. There had not been enough opportunities for research funding. The CHESS developers included them in proposals but none was funded. Even though the Vice President of Fund Development helped with the Cardiology Department's effort to use the module, and the CHESS heart disease module received money from a hospital fundraiser, the burden to fund the use of CHESS was greater for Cardiology than for the Cancer module. Because of these greater funding difficulties, the heart disease module had only a half-time CHESS coordinator, whose other responsibilities at times took precedence over her work with CHESS.

### *8.7.3. Technology Usefulness*

The CHESS module for heart disease met users' needs for information and support in the same way as the breast cancer module did. Access to the module was not as much of a problem with the heart disease module because it was first implemented on the Internet versus the more labor intensive installation of the DOS version of CHESS. There was a perception, however, that the heart disease module was not a priority for the developers, and thus was not kept up to date as well as other CHESS modules. In addition, usage rates for the heart disease module were low.

### *8.7.4. Promotion*

The promotion strategies for the CHESS heart disease module were similar to those for the breast cancer module, including articles, presentations, and demonstrations of the module. Unlike for breast cancer, however, marketing directly to patients (primarily through one-on-one conversations after showing the video to the patient while in the hospital) was the most successful approach for heart disease. The heart disease module lacked a champion, both at the corporate level and at the department level. While the cardiology Nurse Manager worked hard on CHESS, the Chief of Cardiology's interest and involvement did not last. It would have been especially valuable to have some cardiologist champions, since cardiologists had virtually no involvement in this implementation.

### *8.7.5. Implementation Process*

The Cardiology Department was involved in the initial development of the heart disease module, thus gaining early experience with how the module could best be implemented within the clinical setting. The implementation also had an experienced coordinator who was familiar with the existing department systems as well as with the demands on clinic staff. The plan to try out CHESS in a pilot study was a good one because it provided a way to test recruitment and implementation approaches as well as patient acceptance of the module. The module had a difficult time getting established in this department because it took longer than expected to figure out the best recruitment approach, and the eligibility requirements for the research study were strict. Another problem was that the cardiology group felt they were not informed about research efforts and other opportunities with the developers.

LESSONS LEARNED

Continually improve implementation processes. Re-evaluating implementation strategies with regard to acceptance and accessibility of the technology is critical. The physician referral may have been more important in the beginning; it may be wise to put recruitment efforts elsewhere, such as connecting directly with the patients as the implementation proceeds.

### *8.7.6. Department–Technology Fit*

At the time of the cardiology implementation, staff was slightly more familiar with computers and the Internet, so new technology did not create as much of a barrier as with the breast cancer module. Negative feelings toward the Oncology Department (the host department for CHESS) translated into negativity toward CHESS on the part of some cardiologists. Because CHESS was used in cardiology without the physicians being part of the process, however, this negativity did not have a significant effect on the implementation. It took some time to find the best way to integrate the module with existing services and procedures in the department. CHESS was ultimately integrated into an existing referral system used for other behavior management modules like smoking cessation and stress management. It was then offered after a critical cardiac event, which is an ideal moment for patients to consider behavioral changes.

### *8.7.7. Key Personnel Awareness and Support*

Cardiology did not have the level of department manager or physician support needed to sustain the commitment that was needed for successful implementation. Unfortunately the implementation did not gain as much momentum and support among cardiology clinical staff as it did in the Cancer Center before the advent of the Internet, when the uniqueness and innovativeness of CHESS began to fade. Some clinical staff believed that many Internet projects did what CHESS did, and for much less money. Furthermore, the outcomes data on CHESS for heart disease patients was not as strong as it was for breast cancer patients.

## Conclusion

Interest in implementing CHESS continued in several departments. The Cancer Center signed on as a partner for the development of a new CHESS program on prostate cancer. The physician champion was instrumental in securing funds from the American Cancer Society for the research. The Cancer Center participated in the needs assessment and provided personal stories for the module itself. The Center was also one of the sites for a study examining the impact of computer-based support on prostate cancer treatment decisions. Recruitment went well for the research study, primarily because the urologists at Union Hospital were in one practice and onboard with the module. When the study ended, the module was offered to all prostate cancer patients at the hospital.

The Preventive Cardiology group participated as a test site for the CHESS smoking cessation module for teens. The hospital was also part of a funding proposal to develop a palliative care CHESS module, but that project was not funded.

Central administration leadership and vision was key to the initiation and establishment of CHESS at Union Hospital. Key benefits of their participation were evident in the experiences of the Breast Cancer Clinic, whose clinicians and patients, once interested, readily accepted CHESS as a key component of their clinical care. Early buy-in by key physicians helped launch the project; later, mistrust and suspiciousness between clinical divisions impeded the success trajectory anticipated by the early adopters.

Critical also to the sustainability of CHESS among the breast cancer patients at Union was the development of tolerance for various pathways to inviting patients to participate with the technology-based support. After five years, many breast cancer patients learn of the CHESS resource through conversation with their clinicians, usually their nurse or doctor. CHESS never fully migrated into the preventive cardiology practice. While the lack of a tradition of collaboration among departments at Union may have explained the differential adoption pattern, it is also plausible that technology costs and maturation, and fit with the clinical care demands may have impeded adoption.

# 9

# Strand Hardin Health Care, 1995–2002

Tracy Siegler, Betta Owens, Gail Casper, and John Fellows

In 1995, Strand Hardin Health Care set out to launch CHESS – a computer-based source of information, social support, and decision tools for patients facing a health crisis – against substantial odds. The non-profit teaching hospital and physician network was formed that same year by a merger of three separate organizations. The merger created a health care resource and referral center for a population of one million throughout its state and part of a neighboring state.

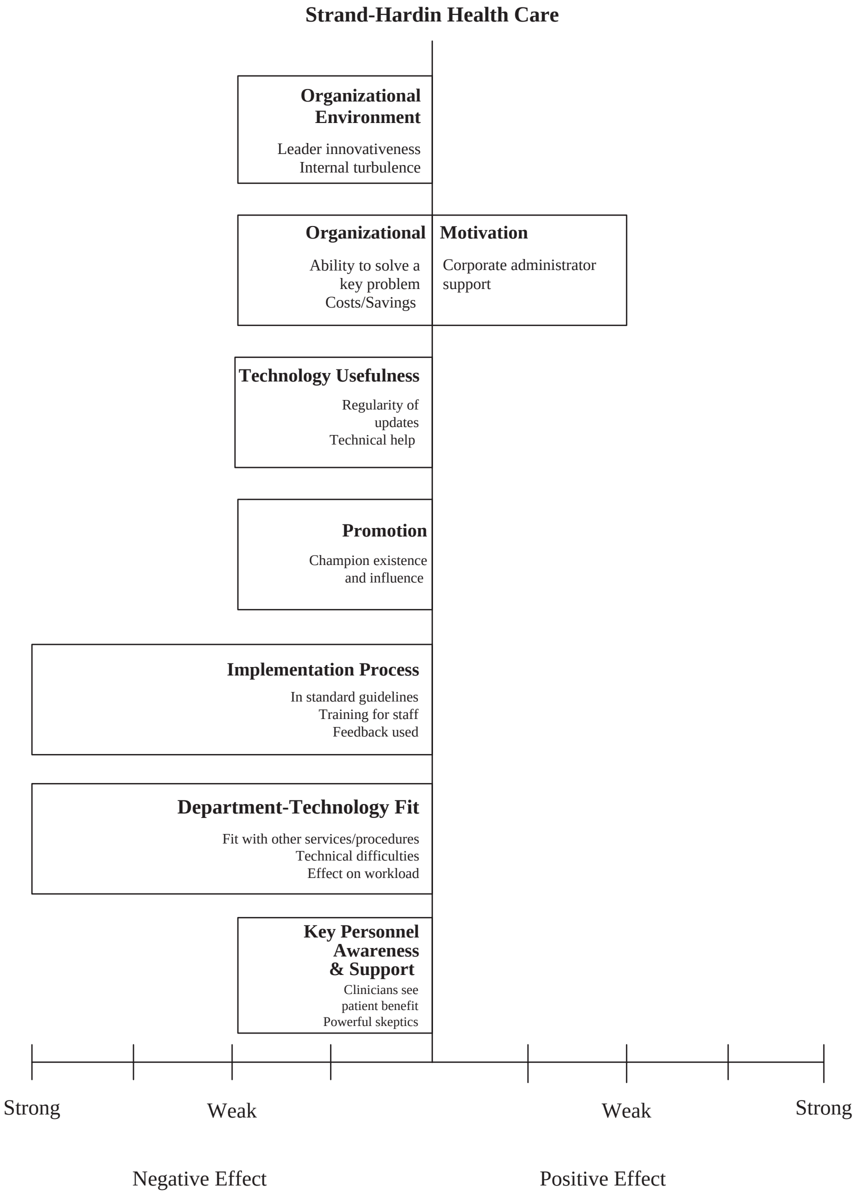
During the first few years of CHESS implementation, Strand Hardin suffered turbulence in its organizational leadership at the same time it was suffering financial difficulties. This period of time was also characterized by high turnovers and staff shortages in health care organizations throughout the country. Strand Hardin was no exception. As implementation progressed, interest and support were lacking from key clinicians and leaders in the organization. Even today, those in charge of the project have difficulty presenting hard evidence of the benefits of the project to the organization and its patients. In this study we will examine the conditions that allowed for a moderately successful implementation of CHESS at Strand Hardin Health Care despite facing substantial challenges in staff support.

## 9.1. Description of Environment at the Site

Strand Hardin, at the time of this writing, has 560 beds and a medical staff of 590 physicians and 250 residents. The three founding organizations that merged to create Strand Hardin were a small religious hospital, a 500-bed teaching and tertiary care hospital, and 10 practice groups of 250 full-time faculty of the local university's college of medicine. As an academic medical center, Strand Hardin's mission is to improve the health of the population it serves through health care services, teaching, and research.

Strand Hardin is located in a university community surrounded by rural areas. In this community the number of households with computers is higher than in other areas of the country. This particular implementation occurred when Internet access and the availability of information on the Internet were exploding across the country and around the world.

The five years following the founding of Strand Hardin brought significant change and upheaval in the new organization, including three different CEOs.



The first was unable to devote his full time to the fledgling merged organization because he also remained dean of the medical college. He retired after serving as CEO only 3 years, and an interim CEO was named. About 6 months later, a third CEO was appointed and remained in the position at least until this case study was written. In the words of one Strand Hardin employee who has held various administrative leadership positions:

> It's been a very tough seven or eight years here, with many, many things going on that distract people from the real reason we're here. Whenever we're distracted, if you look at Maslow's hierarchy, everybody moves back down to this survival kind of mode. You don't have as much energy to give to something that's innovative because that's much higher on the hierarchy, and you never get there.

In addition to leadership changes at the top, changes were also taking place in the structure and leadership of various departments throughout the organization. The effects of a national nursing shortage were far-reaching. A community outreach coordinator who had been with Strand Hardin for 18 years related the effect this had on her work:

> Right now in the last three months we've lost five of eight nurse managers. So, if you had any relationship with a nurse manager on a particular floor, she or he is now gone and you have to start over. We have an attrition rate of about 20 percent, which isn't huge, but that means you have staff turnover of 20 percent all the time… Many of them retire, so we have an older workforce.

The same community outreach coordinator noted the difficulty she had connecting with physicians.

> When I try to go to [a particular physician] to talk about CHESS he gives me five minutes. Well, you can't say a lot in five minutes. He understands that it'll make his job easier and it'll help his patients do better with whatever they're trying to do. But it's just one more thing. And I think it's just one more thing that everybody wants them to do.

All of this was exacerbated by financial concerns that stemmed from government efforts to control the cost of health care, as well as Strand Hardin's mission to stay afloat in the wake of the merging of three different organizations. Despite these difficulties, the organization was expected to maintain its level of excellence to the communities it served.

### FOCUS ON: *Organizational Turbulence*

So was this a bad time to try implementing something new? Not necessarily. In fact, a time of change can be a good time to introduce something new. As turbulence forces old habits and methods out, the status quo can no longer dominate. New procedures have a chance to get a foot in the door. Furthermore, it is seldom practical and often impossible to find a time when circumstances are perfect for introducing something new. Awareness of challenges being faced by an organization, and finding ways to use them to the organization's advantage, will aid in the introduction of IHCS. By paying attention to the current organizational situation, Strand Hardin staff found an opportunity to bring CHESS to the organization.

## 9.2. Timing of the Implementation in the History of Chess

At the time that the implementation of CHESS at Strand Hardin began, the concept was innovative. It was introduced to Strand Hardin after being presented at a meeting of the Institute for Healthcare Improvement. The system was DOS-based, and everything was stored on the user's computer's hard drive. Computers were supplied to study participants. Users had to be trained how to use computers, which were delivered to their homes. Over the years that Strand Hardin was implementing CHESS, significant developments in computers and software meant that the system changed significantly in terms of interface, access, and where the module and data were stored. In fact, the first offering of CHESS via the Internet was through the Strand Hardin website. Eventually, CHESS would become entirely Internet based.

At first, only the breast cancer module was available for use, and only to participants in studies researching the benefits of CHESS – open enrollment would come later. Development of other modules was beginning for conditions such as heart disease, HIV, and caregivers for Alzheimer's and dementia. The CHESS research consortium was in the middle of a growth spurt at the time – Strand Hardin was the fourth member of the consortium, and five more organizations would join in the year and a half that followed.

## 9.3. Early Exposure and Decision to Adopt

Just months after the formation of Strand Hardin, CHESS was presented at a health care quality improvement conference. The Vice President of Quality Improvement at Strand Hardin attended. When he returned from the meeting he discussed the system with the administrative leader of Primary Care, and the Medical Director, who both liked the idea of the system.

The CHESS breast cancer module provided patient-centered approaches for women experiencing breast cancer; thus it seemed like it might be a good fit for the newly forming Breast Care Center. The Vice President and an employee in the Quality Improvement department took the idea to the cancer committee, which included patients, clinical staff, department leadership, and opinion leaders. The committee was supportive of the system, giving approval for its use in the Breast Care Center. However, there was no designated leader for the center at that time, hence no one person was responsible for making the implementation happen. A significant consequence was a delay in approaching clinicians regarding issues around workflow and likely outcomes.

Late in the summer, just after a steering team for the Breast Care Center was formed, a group of developers of CHESS visited Strand Hardin. The developer group, which included the system's founder, made a presentation focusing on the use of CHESS as a research tool. The steering team saw the opportunities for research as an advantage to the system. Further discussion also revealed a potential fit for CHESS with an existing breast cancer study.

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FOCUS ON: *Department-level Champions*

Things were going well in gaining support for CHESS among the leadership overseeing the creation of the Breast Care Center, but those who felt strongly that the system should have a place in the Breast Care Center were not the people whose everyday work would be affected by its implementation. Perhaps more should have been done early on to get input from the clinicians and staff who would be working in the center and those who would be doing the research work, as well as to inform them about CHESS, its potential benefits, and how it would be implemented.

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Several strategies to increase awareness and involvement with CHESS were undertaken. An employee from the Quality Improvement department attended the annual meeting of the CHESS research consortium. Additionally, stimulated by activities within the CHESS consortium, she and the administrative leader of Primary Care began discussions with Cardiology. They wanted to determine whether there was interest in participating on the CHESS consortium advisory panel that would lead the development of a heart disease module. She also began conversations with people in clinical research to build support for membership in the consortium. Clinical Research was willing to provide assistance to anyone who wanted to use the system in a study; however, a clinical champion did not emerge from any department.

About a year after CHESS was first considered, enough support for implementation at Strand Hardin had been garnered. Those who were involved in the decision to adopt CHESS, including the leadership of the Breast Care Center, felt the system would help them meet patients' information and support needs more effectively. They were also interested in collaboration with another major research institution, providing potential opportunities for the organization to get involved with cutting-edge research. Additionally, they hoped the founder's expertise and international reputation would help them enhance their reputation for patient support and health care quality in general. Strand Hardin committed to joining the consortium; the annual fee was paid by the Breast Care Center.

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FOCUS ON: *Promotion and the Decision to Adopt*

How much support is needed before making the decision to go ahead with a new technology? In this case, the Breast Care Center steering team had agreed that CHESS and collaboration with the developers were opportunities they wanted to take advantage of, so they paid for the consortium fee to give Strand Hardin access to CHESS. However, what appeared to be absent from cardiology and clinical research, as well as among clinicians and staff in the Breast Care Center, was the kind of enthusiastic support that would be translated into committed action when the system became available. It is no coincidence that these departments lacked champions for the project. A dedicated and respected champion is critical for maintaining enthusiasm, and for holding team players accountable for their work. The lack of commitment and dedicated champions made for some difficult times as implementation began.

Once Strand Hardin joined the research consortium, recruitment efforts began one module at a time. Each CHESS module focused on a different disease or condition and, of course, a different group of patients. The first module available for use at Strand Hardin was for breast cancer patients.

## 9.4. Implementation of the Breast Cancer Module

To generate early experience with CHESS prior to the decision to become part of the consortium, the Vice President of Quality Improvement recruited two volunteers who were fully informed of the project and shared concerns of women with breast cancer. One was a personal friend who was also a Strand Hardin employee. She became an advocate for CHESS within the organization. The second user was the wife of Strand Hardin's first CEO, a woman of prominence in the community. She was also involved in starting the patient education center at Strand Hardin, so she was an advocate not only for CHESS, but also for other means of patient education. These volunteers were well poised to become early champions for the project.

A university psychologist doing research on the counseling of women with breast cancer agreed to lead CHESS for the Breast Care Center because funds for CHESS implementation would continue to support his staff until his next major research grant started. He agreed to add a CHESS component to his next grant application. Although he anticipated incorporating CHESS into his other projects, he and his staff decided not to. They discovered that offering CHESS to patients who were also participating in their study (comparing one-on-one support with group support for newly diagnosed breast cancer patients) would invalidate their data.

Because of competition for participants, CHESS was only offered to patients who lived too far from the hospital to be involved in a face-to-face support group or who for some other reason refused to participate in other studies. This greatly reduced the number of patients to whom CHESS was offered.

Several other aspects of the implementation fell into place. Information Services at Strand Hardin agreed to maintain the hardware for an implementation at the Breast Care Center, and the auxiliary committed to buying 40 laptop computers for the study. This was the first time laptops would be used for the implementation of CHESS, so the developers re-wrote implementation and patient support materials accordingly, documenting how to use the laptops. A team of CHESS developers, including the founder of the system, visited and met with oncology nurses and psychology fellows to formalize the plan for the CHESS research that would be done at the Breast Care Center, including engaging existing users to demonstrate training strategies. A few of the psychology fellows were identified as recruiters and trainers for the project.

Despite what appeared to be a positive environment for implementation, there were signs that the Center's commitment to the project was lacking. The absence of incentives and accountability plagued the implementation. Although the psychologist who had taken on the CHESS research felt it would be beneficial to some of his patients and would provide opportunities for further research, he did not seem interested in spending much of his time supporting the project. Likewise, the head recruiter/trainer for the implementation was also unwilling or unable to devote much time. She refused offers for weekly communication, support, monitoring, and advice over the phone from the developers, and seldom turned in the monthly recruitment report forms they requested. Throughout the implementation the developers still attempted to keep in close contact with the implementation staff, suggesting ways to keep the implementation organized and moving forward. According to one of the researchers, however, the group still felt it had been handed the project without being adequately trained or supported by the developers, and felt misled about how much staff time would be required. Breast Care Center administrative and clinical leadership appeared to be losing interest in the project as well.

The technical performance of the system and the laptops was not as quick and smooth as the research staff at the Breast Care Center expected it to be. Since CHESS was DOS-based at the time, it took a long time to load and open. Laptops had never been used in a CHESS implementation prior to this one, so they presented new problems that the developers had to work out. It was also reported that the laptops themselves were often unreliable. Furthermore, there were complications with getting CHESS loaded on the laptop that was given to the first CEO's wife, one of the earliest and most influential users. As a result of the problems she had, her opinion of the system was somewhat soured. The other early user eventually became less of an advocate as well, not because of any problems or bad experiences with CHESS, but because she preferred to be more confidential about her condition.

The effort required for recruiting and training patients to use CHESS was more than the research staff was prepared to put forth. Within the first year of the implementation an idea came forward to have volunteers who were breast cancer survivors train the users. The plan had the potential to lighten the load on the researchers and benefit both patients and volunteers. Volunteers were recruited and were eager to help. Representatives from the developers came on-site to train them. Again, however, commitment from the Breast Care Center seemed to be lacking. The head recruiter/trainer for the project, for instance, was absent on the day of the training and later had complaints about the complexity of supporting the volunteer trainers. The volunteers were never put to use as planned.

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FOCUS ON: *Department–technology Fit*

As preparations were underway for implementation in the Breast Care Center, it was discovered that what originally looked to be a good fit with an existing research project was actually a conflict. The staff was not prepared for the amount of work that was required, and technical difficulties with the system and the laptops made it even worse. Furthermore, Strand Hardin joined the consortium with the expectation that CHESS would be offered to all patients in the Breast Care Center. Perhaps there was insufficient planning and/or communication of the details of the implementation. Perhaps the staff was not sufficiently briefed about CHESS and what their role in the implementation would be. Perhaps researchers were not ever truly committed to the project and only agreed to participate because they needed financial support or were feeling pressure from the Breast Care Center steering team. It is understandable that psychologists could be reluctant to wholeheartedly embrace computer-based support for patients when face-to-face support was their profession. In hindsight, it appears that expectations for the project should have been more effectively managed by the developers as well as by the managers and researchers in the Breast Care Center, and that the problems encountered could have been alleviated with closer day-to-day support and involvement from Breast Care Center leadership, including medical staff, CHESS champions such as the Vice President of Quality Improvement and the administrative leader of Primary Care, and the developers of the system.

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The psychologist and his research staff were not able to include CHESS in further research efforts. By this time, almost 2 years after the implementation had started, there was greater focus on reducing costs in the organization. The leaders of the Breast Care Center saw cutting the system from the budget as a good way to reduce costs.

But CHESS supporters in the organization did not give up on using the breast cancer module. Instead they explored other ways to make CHESS available to their members.

## 9.5. Analysis of the Breast Cancer Module Implementation

In any implementation, many factors affect the project's success or failure. The model described in Chapter 5, Implementation Model Development and Testing contains many of the most important determinants of implementation success. Of those factors, the following had a role to play in the implementation of CHESS in the Breast Care Center.

### *9.5.1. Organizational Environment*

The environment was favorable for implementation in that there was considerable focus on the breast cancer cause in the community at that time. As the Breast Care Center was being formed, leaders were looking for innovative ways to care for these patients. On the other hand, this implementation also started during the organization's early forming stages when there was a great deal of turbulence that sometimes distracted people from taking on new things.

### *9.5.2. Organizational Motivation*

In the beginning of the implementation, the motivation to implement was strong. The patient-centeredness of CHESS and the opportunities for research fit with the values and goals of the department, and the opportunity for a relationship with the developers fit with the quality improvement goals of the organization. The benefits of this relationship were described by the administrative leader of Primary Care: "The staff of [the developers] offered a lot of advice, support, and guidance, a knowledge base that [Strand Hardin] didn't otherwise have, particularly a relationship with [the founder of the system]. So, organizationally, completely aside from CHESS, we had some secondary gains that were great," she said. However, it was expensive for the organization to be a member of the consortium that allowed them access to CHESS.

### *9.5.3. Technology Usefulness*

Breast Care Center leaders liked the fact that CHESS could be conveniently and affordably accessed by patients at any time of the day or night. However, they may have been given the impression that this innovative technology could be implemented and used smoothly and easily with minimal work required on the part of staff at the center. Strand Hardin did not provide technical support for users, so the developers provided technical support over the phone. However, research staff felt that technical and implementation support from the developers was insufficient.

### *9.5.4. Promotion*

Some impressive things were done early on to gain organizational acceptance for CHESS and to get the project off to a good start. The idea of the system was first presented to the cancer committee, and then when the steering team for the Breast Care Center was formed, the developers gave a presentation that led to the adoption of CHESS. The auxiliary also helped to raise awareness of the project in the community when they provided laptops for the implementation. As commitment to the project waned, however, so did promotion in the organization and community. The two earliest users of the system at Strand Hardin, who were recruited by the Vice President of Quality Improvement, were champions for the system at first but did not remain so for long.

### 9.5.5. *Implementation Process*

Research staff in the Breast Care Center felt that they lacked training to carry out the implementation. Recruitment and support processes were not as effective as they hoped, but there was little effort put forth by the implementation staff to make improvements.

### 9.5.6. *Department–Technology Fit*

Implementation created more work than the staff was prepared for. Technical difficulties made it more time-consuming to get users set up with the system, and more difficult for them to use it once they were set up. When the researchers began to feel that this implementation was going to interfere with another study they were planning, these challenges gave the less-than-committed team a reason to stop support of the project.

LESSONS LEARNED

Although this first implementation left a bad taste in the mouths of staff at the Breast Care Center, some important lessons were learned. It was clear how important it is to have a **large enough staff that is well prepared and trained for implementation**. Both developers and Strand Hardin learned that a critical part of being prepared is having **realistic expectations** about what the technology can do and how much work it will require. Innovative approaches can be especially labor-intensive and slow to show benefits. It is also crucial to find ways to **retain both staff and management commitment to the project**. Perhaps the most important lesson learned was that the project needs to have **clear goals that align with the goals and work of the department** and the staff who are implementing it.

### 9.5.7. *Key Personnel Awareness and Support*

A major problem in this implementation was that opinion leaders, department managers, and other clinicians in the Breast Care Center did not actively encourage the use of CHESS or remove barriers to its implementation. As the implementation failed, however, the original proponents of the system did see the positive response from patients as evidence of CHESS's promise.

There was not a large enough sample size from which to draw solid conclusions because only those who refused to be involved in the psychologist's support group study were offered the system. Since this group had refused an initial offering for information and support, the fact that many of them liked CHESS and found it helpful was viewed as evidence of the system's potential to help all patients. The quality improvement department was committed to making sure that the system did not fall by the wayside.

When CHESS was cut from the Breast Care Center budget, a new Vice President of the Quality Improvement Department agreed to pay the fee for membership in the research consortium out of her budget. This allowed Strand Hardin to continue to offer the module to patients. However, her budget had no room for staff or other resources to support implementation efforts, so the breast cancer module of CHESS was put on Strand Hardin's back burner starting 2 years after the implementation began. As the breast cancer implementation was struggling, however, a pilot of a new module for heart disease was underway.

## 9.6. Implementation of the Heart Disease Module

Discussion about the heart disease module of CHESS began at Strand Hardin before the organization became a member of the CHESS research consortium. There was discussion of Strand Hardin's cardiology department being involved in the advisory group for the development of the module, but the idea went no further than the discussion phase for two more years. The administrative leader of Primary Care contacted a cardiology rehabilitation doctor about being involved in an initial pilot study of the heart disease module. He agreed it would be a great opportunity for their rural patients, although he felt that his rehab program offered all of the support and services that his local patients needed.

A registered nurse, who was an educator in the Strand Hardin Quality Improvement department, took on the coordination of the pilot of the new heart disease module. Unfortunately she had little time for the project, though she and the manager in the department both felt this was important work for them to fit in. To circumvent the staffing problem found in the Breast Care Center, the registered nurse took on most of the recruiting herself, eventually with some assistance from a nurse practitioner.

However, finding eligible patients proved to be difficult. Participants had to meet very specific health criteria and were limited to patients who lived within a 30-mile radius of the hospital. The latter criterion was added to reduce the nurse's time doing installations and training. As a result of this 30-mile radius limitation, rural patients never benefited from CHESS as had originally been planned. In the end, only a handful of Strand Hardin patients participated in the pilot. According to the nurse, "Numbers were very small compared to all the other areas that did this. But I can certainly say the people who did it, who participated, were very pleased."

As with the breast cancer module, organized implementation of the heart disease module did not continue after the initial pilot test. After the pilot, the cardiac rehab doctor participated by reviewing and providing feedback on a grant proposal to study the effects of the module on lifestyle change, but it was approximately 12 months until the next attempt was made to get CHESS into the hands of patients.

## 9.7. Analysis of the Heart Disease Module Implementation

The following factors in the model described in Chapter 5, Implementation Model Developing and Testing played the biggest roles in the outcome of the heart disease module pilot.

### *9.7.1. Organizational Motivation*

Lack of resources for this project created major difficulties. There was insufficient time available to carry out the basic tasks of identification, recruitment, and support of users. Also, there were no funds to provide good equipment so users had to make do with very old computers.

### *9.7.2. Technology Usefulness*

Few eligible participants were found. However, as with the breast cancer implementation, the few patients who used the module liked it. Although the nurse spoke of the lack of dedicated technical support from Strand Hardin as a disadvantage, she did make use of the technical support that the developers offered. She reported that when she called them for help, they were supportive and patient with her even though she admitted to being unfamiliar with computers at the time. She also gave the CHESS helpline number to the users and they found the developers to be polite, helpful, and timely in their responses.

### *9.7.3. Department–Technology Fit*

A primary difficulty for this implementation was the significant time required of the nurse for user installations. It took her even more time, she admitted, because she had little prior experience with computers. Because she took on almost the entire burden herself, however, there was little burden on the staff in the Cardiology Department.

LESSONS LEARNED

The nurse who implemented CHESS in cardiology felt that she could not ask clinicians and staff to do anything that would increase their workload. While it is important to **consider the time constraints of clinicians and staff**, it is absolutely necessary to **allocate sufficient personnel time**. There was not nearly enough of the nurse's time available to carry out the work that would have been required for a successful pilot. Ideally, there should be a **balance between the effort put forth by the department and by outside staff** in an implementation such as this. Continued implementation would have been more likely if the nurse had succeeded in getting clinicians and staff to assume responsibility for, and become involved in, the project. And so a lesson from the Breast Care Center is reiterated here: **Genuine commitment and involvement, rather than mere consent**, is necessary from clinicians and staff in the department where the implementation is taking place.

### *9.7.4. Key Personnel Awareness and Support*

The Cardiology Department never took ownership of the implementation; they merely allowed the nurse to enroll their patients in the project. She was the only person actively working to push the project forward and no one in cardiology committed a significant amount of time to the project. Fortunately, the Quality Improvement department was committed enough to pursue the idea of a pilot study in cardiology and allow the registered nurse to allocate some of her time to the project. Even this, however, was not enough given the shortage of staff time to make implementation last.

## 9.8. Exposure to Other Chess Modules

Two other CHESS modules were introduced at Strand Hardin during the initial breast cancer module implementation: “Living with HIV/AIDS,” and “Caregivers for Persons with Memory Disorders, Alzheimer’s and Other Dementias”. A computer with the CHESS HIV/AIDS module was given to the HIV Clinic. Later that summer, a representative from the CHESS developers went to Strand Hardin to meet with the staff at the HIV Clinic, as well as with the nurse from the Training and Education Department. The clinic did not have the funding or personnel to implement the HIV module, and management in the clinic feared that the loaned laptop computers would be misused. A computer with the caregivers for Alzheimer’s and dementia module already loaded on it was given to the memory disorder clinic so that a nurse in that clinic could evaluate the content. The memory disorder clinic also could not find the funding or personnel to implement the new module.

During the three years that Strand Hardin had been a member of the CHESS research consortium, four modules had been introduced to the organization. Of those modules, active recruiting had been done for two, but after a short time had been discontinued. The other two modules were looked at by Strand Hardin staff but were not being used. If it were to be worthwhile for Strand Hardin to remain a member of the consortium, something would have to be done to increase recruiting and patient use of CHESS. As the Internet became more widely used, an Internet implementation was begun.

## 9.9. Implementation Through Community Health

Three years after CHESS was first implemented, two key people who had worked to bring CHESS to Strand Hardin had left the organization. Attempts at implementing different modules in various departments at Strand Hardin had met with minimal and short-lived, if any, success. Yet the remaining strong proponents of CHESS, the administrative leader of primary care and the Vice President of Quality Improvement, still felt that CHESS could be of great benefit to patients. Additionally, they felt that membership in the CHESS research consortium would benefit the organization. Strand Hardin was in the midst of leadership changes as well as restructuring and cost-cutting efforts, and they knew that the CHESS project was in danger of falling by the wayside unless they took action.

During the transition months for CHESS, it was suggested that a steering team approach might help with getting buy-in for the project from providers and leadership. A steering team was identified that included the Strand Hardin Webmaster, the Vice President for Information Services, the Vice President for Patient Care Services, and representatives from the Breast Care Center, Public Relations, and other Strand Hardin departments. A search was also begun to find a more viable home department for CHESS within the organization. The Community Health department was identified because CHESS fit with the department's goal of helping community members access services, educational resources, and other information to assist in maintaining health and quality of life. The director of Community Health was named the CHESS coordinator at Strand Hardin. The CHESS coordinator at an organization is typically the primary person responsible for the project at that organization, and the liaison between the organization and the developers.

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FOCUS ON: *Fit with Other Services*

Advocates for CHESS had tried, with little avail, to find a department where CHESS would fit well. Efforts to implement single modules in individual departments resulted in low usage and little commitment from the departments themselves. Instead of giving up, however, they found a department where they felt the implementation was more likely to succeed. CHESS fit well with the other educational services and activities as well as the philosophy of Community Health, and the department was already a resource for information and support on a variety of health-related topics.

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During this time the early supporters of CHESS were also working to identify a Strand Hardin leader to champion the system. Such a champion would need to be influential and believe in the benefits of CHESS in order to effectively advocate for membership in the consortium and use of the system, pushing the project forward at Strand Hardin. The founder of the system and the director of the consortium met with senior leaders to present CHESS and other health quality work that the founder had done. The Medical Director was identified as a potential champion for CHESS. He worked to arrange an opportunity for the founder and others involved in the system's development to present CHESS to researchers at Strand Hardin and the university who might be interested in using it as a research tool. Key opinion leaders were identified and encouraged to attend the presentation. Individual meetings with the development staff that had come to give the presentation were also arranged.

A new way to offer CHESS at Strand Hardin began to be investigated. The director of Community Health started meeting with a Strand Hardin primary care provider who was working on a Web-based physician–patient communication application intended to push information to patients and get them to communicate with the physician office. The goals of the system aligned with the patient education and empowerment goals of CHESS. At this time there was also a trend toward health care organizations developing extensive websites to better serve their patients. Many organizations found it difficult, however, to create and maintain Internet-based information that was detailed enough to be useful and still kept up to date. If CHESS could be put online as part of Community Health's section of the Strand Hardin website, this would not only provide a valuable service to Strand Hardin patients, but would also serve as website content that Community Health and Information Services would not need to concern themselves with updating.

A planning team that included the CHESS developers was formed to look at the viability of online access to CHESS for Strand Hardin patients and community members. With the support of the Vice President for Information Services, one of the team members was trained by the developers on the technical requirements for online access to the system. As he was going through training, the rest of the team started working and meeting regularly to set up the online registration program.

The Community Health Department sponsored a Resource Center, a place where patients could go to access health information and medical literature. This center was identified as the most logical place to establish the CHESS registration process. The CHESS breast cancer, heart disease, prostate cancer, asthma, and menopause modules were made available to patients.

The center was strategically located at the front of the hospital, which gave better visibility for the system and made the recruitment of new users easier. The coordinator of the Resource Center joined the planning team. She was trained to recruit, register, and train patients to use the system in the Resource Center. She also registered users via e-mail and provided e-mail registrants with basic information on how to use the system.

The planning team worked for about six months, and then the system went live, registering eight people in the first month. The nurse who served as Outreach Coordinator in Community Health assumed the role of CHESS coordinator. Shortly after assuming that role, she began discussing Strand Hardin's participation in the development and testing of a teen smoking cessation module with another organization in the CHESS research consortium. The two organizations, however, could not come to an agreement on a research design, and each wanted to work with a different age group. It was mutually agreed that Strand Hardin would not participate in the study.

By early spring of the following year, the CHESS coordinator and the coordinator of the Resource Center had identified an opportunity for improvement in the registration process. The original procedure required patients to request registration and then wait for someone at Strand Hardin to process their request, which could take several days. This delay was intended to insure that the user was really a patient or primary support person so that discussion groups would continue to be protected environments with no interlopers. The two coordinators felt they could increase usage of the system by providing new registrants with immediate access when they logged on. They met with the Webmaster in March about the feasibility of automating the online registration process. He approved of the idea. In October, he put the finishing touches on the process, and the automated registration system was put into practice.

“THINKING OUTSIDE THE BOX”

…a common cliché, but it describes well Community Health’s efforts. Offering the system online was something new, and no other consortium member had tried online registration prior to this. It offered the advantage of saving time for staff as well as making registration easier and faster for users. Prior implementation efforts at Strand Hardin showed that labor-intensive processes for identifying, referring, and supporting users of CHESS did not pay off. Online solutions were innovative as well as more realistic in terms of what could be accomplished with the resources that were available.

With CHESS available on the Internet, and registration automated, the CHESS coordinator had more time to work on promoting the system within the organization and in the community. The Web-based implementation process depended on patients being proactive in seeking Web-based information, finding the website and the CHESS system, and requesting access. Community Health was not in a position to market directly to patients. It did not have a strong presence in the clinics and would not necessarily catch people at a time when they could benefit most from information and support via the Internet.

Despite these challenges, the CHESS coordinator found many creative ways to spread the word about CHESS. The system was promoted to patients via the Strand Hardin website, presentations in the community, public service announcements on radio and television, an article in a business magazine, flyers in physician offices and waiting areas, tear-off cards with CHESS information on them, a patient education kiosk, and information pre-printed on the bottom of discharge summary sheets. CHESS was also promoted through a physician–patient communication project that included a website that allowed patients to make appointments with their providers and to reorder prescriptions. This proved to be the most effective means of promotion. Furthermore the coordinator made presentations to patient support groups.

CHESS was also marketed internally to Strand Hardin. It was promoted on the hospital's intranet. The coordinator talked to groups of nurse managers and made presentations at staff meetings and orientations for new nurses. Many of these presentations included demonstrations of the CHESS website. Additionally, discussions of CHESS were held with other providers as part of a research seminar series, and it was promoted via e-mail to various individuals. Surprisingly, however, regular progress reports were not made.

### FOCUS ON: *Promotion*

Once registration for users was streamlined, the CHESS coordinator saw that promotion was critical, and set to work. Her efforts affected various groups of people, both within the organization and in the community. A wide variety of methods and means of communication were used so that as many people as possible would hear about CHESS, in as many different ways as possible, and this was important. However, key people did not receive regular progress reports. Early supporters eventually lost touch with what was going on with CHESS. There were no efforts reported to keep the Medical Director (who had been identified as a champion), members of the steering team, or researchers who had attended the developers' presentation up to date on how CHESS was doing. With all the focus on building awareness of the existence of CHESS, the active involvement of key supporters was lost.

Implementation via the Internet was Strand Hardin's most successful attempt at using CHESS. Even though enrollment numbers still did not "take off" as some would have liked, it became a part of what the department did on a regular basis, and the focus was on ongoing implementation. Feedback was being studied and improvements were being made. Opportunities for participation in research using CHESS were being investigated. The CHESS coordinator was able to devote time to the project, and the organization had learned what kind of usage rates could be expected.

## 9.10. Analysis of the Community Health Implementation

The factors that had the largest effect on the outcome of the Community Health implementation are described below and serve as a useful illustration of how the factors in the model described in Chapter 5, Implementation Model Development and Testing can play out in a real-life situation.

### *9.10.1. Organizational Environment*

The environment was, for the most part, favorable for the implementation of CHESS at the time when this was being considered at Strand Hardin. Internet use was growing by leaps and bounds throughout the world at that time, and in Strand Hardin's community there were an even greater percentage of Internet users than in many other areas of the country. The trend toward extensive hospital websites made CHESS even more attractive.

The main difficulty that the environment presented was a continuing high level of organizational turbulence. External pressures were causing health care organizations, including Strand Hardin, to focus their effort on keeping the cost of health care low while improving patient safety, service quality, and patient care. These factors, as well as the continuing adjustments after the merger that formed the organization, led to an environment in which there was little focus on innovation. As the Strand Hardin Webmaster put it, "People in this organization have been preoccupied with other, more important issues like budget and image of the organization."

LESSONS LEARNED

This implementation through the Internet was Strand Hardin's most successful implementation effort. The transition to the Internet and online registration kept the **workload at a level that they could realistically expect to sustain long-term**, and allowed time for promoting the program and improving its delivery. The transition to a **home department whose mission aligned with the program's goals** helped to keep commitment to the project at a higher level and to insure adequate resources for the continued use of the program. Implementation in a department not involved in direct patient care emphasized the importance of **continual, effective marketing**. The lack of **dedicated champions among physicians, at the department level, and at the corporate level** accentuated the need for such support. The Webmaster's hard work making online access and registration possible demonstrated the value of a **dedicated technical expert**. Finally, this implementation has shown that **continual evaluation and improvement** of the system used to attract and support users is important for successful ongoing operation of CHESS.

### *9.10.2. Organizational Motivation*

At the time of the transition to the Internet, having interactive health information on a website was innovative. This fit with the values of Strand Hardin as an academic medical center. However, because each module was validated by a formal research study before becoming available for open enrollment, by the time a study was completed, what had been new and innovative prior to the study could find itself lagging behind the competition afterward.

On the other hand, some felt the organization benefited from its relationship with the university-based developers and the founder of CHESS in particular. Top management did not stay abreast of the progress of the project but did give approval when needed – mostly for the budget. Some observed that CHESS would be more protected from budget cuts in Community Health than if it resided in a patient care department. However, not being a care delivery area also meant that by state law the department was not allowed to increase spending even though staff time and other resources for the implementation of new programs were lacking.

### *9.10.3. Technology Usefulness*

One of the most appreciated characteristics of CHESS was its convenient availability for use in the patient's home at any time of the day or night. Some users, however, complained that the system was unwieldy, cumbersome, and not user-friendly. One of the implementers commented that the system should be available in languages other than just English, and should be written at a lower reading grade level. Although usage rates were always lower than was hoped, as Community Health continued promotion of the system, rates increased.

### *9.10.4. Promotion*

Prior to the move to Community Health, CHESS was only promoted sporadically and to limited numbers of people. Once Community Health took over, however, the CHESS coordinator worked diligently to promote the system, and this kept new users coming. There were short-term champions to help bring attention and credibility to the project, but CHESS lacked consistently dedicated champions both at the top level and among physicians. Also lacking were regular progress reports to key personnel throughout the organization.

### *9.10.5. Implementation Process*

Community Health seemed to have established a process for the operation of CHESS that worked well for the organization. The online registration process made things easier because it decreased the amount of work for Community Health to sign up a new user, and more time could be spent on promotion of the system. One obvious problem with the process was that it only targeted those who were already computer users. The coordinator noted that this was not a significant hindrance to the success of the project. "If people were really into computer-based health education they'd probably have access to it. My sense is that there's going to be some who want to use the system but don't have access to a computer, but I don't think it's a huge number," she said.

### *9.10.6. Department–Technology Fit*

Community Health was a fitting home department for CHESS. The system could be promoted as part of its outreach to the organization and to the community as well as through the Resource Center. The Resource Center was a logical place since its target audience was people looking for health information. Because the coordinator was able to find time to promote CHESS, nothing was required of busy clinicians and support staff for the operation of the system, although their endorsement was helpful when they were willing to give it.

### *9.10.7. Key Personnel Awareness and Support*

Throughout most of the implementation there was a lack of awareness or real buy-in throughout the organization. One physician explained a possible reason for this:

> Docs are very independent minded people. They don't necessarily like to recommend something until they really know what it's all about. Then they end up being too busy to really want to delve into and go through a thousand screens, get a good feel for what this is all about. So there's probably people who have good intentions who might agree with the concept, but who still might not be referring people just because they feel like they haven't checked it out enough yet.

In some cases, the organization's memory of difficulties in the Breast Care Center dampened enthusiasm for the system as well. Because they made CHESS available to any patient instead of randomly assigning within an experimental trial, there was really no hard evidence of benefits to users or to the organization from the use of the system. Some of those who worked with CHESS, however, saw individual cases of how it could affect people's lives and believed in this type of patient education as a great improvement over the status quo. These people recognized when the project was threatened and worked hard to generate support to keep it going. As time went by, key people lost touch with how things were going with the implementation, but a new group emerged as the dedicated implementers.

## Conclusion

It might seem improbable that the CHESS project was still surviving after seven years at Strand Hardin given the changes in top management, the difficult financial times, and staff shortages. The project's survival is even harder to understand when one considers the lack of evidence of cost effectiveness or benefits to clinical practice or patients and the initial negative experience with the system still existing in the organization's memory. However, staff commitment and ability to problem solve kept CHESS viable at Strand Hardin. One manager stated that although there was no *hard* evidence of benefits to the organization or to patients, people could see the potential benefits, and that is why the system was kept.

Certainly there have been other things that kept the system alive despite the circumstances. For instance, CHESS fit with the values of the organization and the community – patients need to be involved in decisions about their care through education about their disease. Also, the years that the system was at Strand Hardin were years of rapid growth of information on the Internet and the public's access to it. While this was the case nationwide, the community where Strand Hardin was located used the Internet even more than the average.

One of the most important contributors to CHESS prevailing at Strand Hardin was the handful of people in the organization who believed strongly in the system's ability to benefit the organization and the communities it serves, and to provide opportunities for research and development collaboration with other cutting-edge health care organizations and the developers. Just when the project seemed as if it was ready to be shelved, someone with just enough influence in the organization was able to do just the right thing at the right time to gain enough support to keep it going.

It is significant that responsibility for the project was assigned to a department, not a person. This facilitated long-term planning, budgeting support, legitimacy for the system, and a logical place for people to go for information about the system. Fortunately the staff in Community Health and those who helped with the transition of the system to the Internet were dedicated enough to put significant resources and efforts toward the success of the project. Slowly but surely their efforts began to pay off.

# 10
# Grace Hospital, 1996–2000

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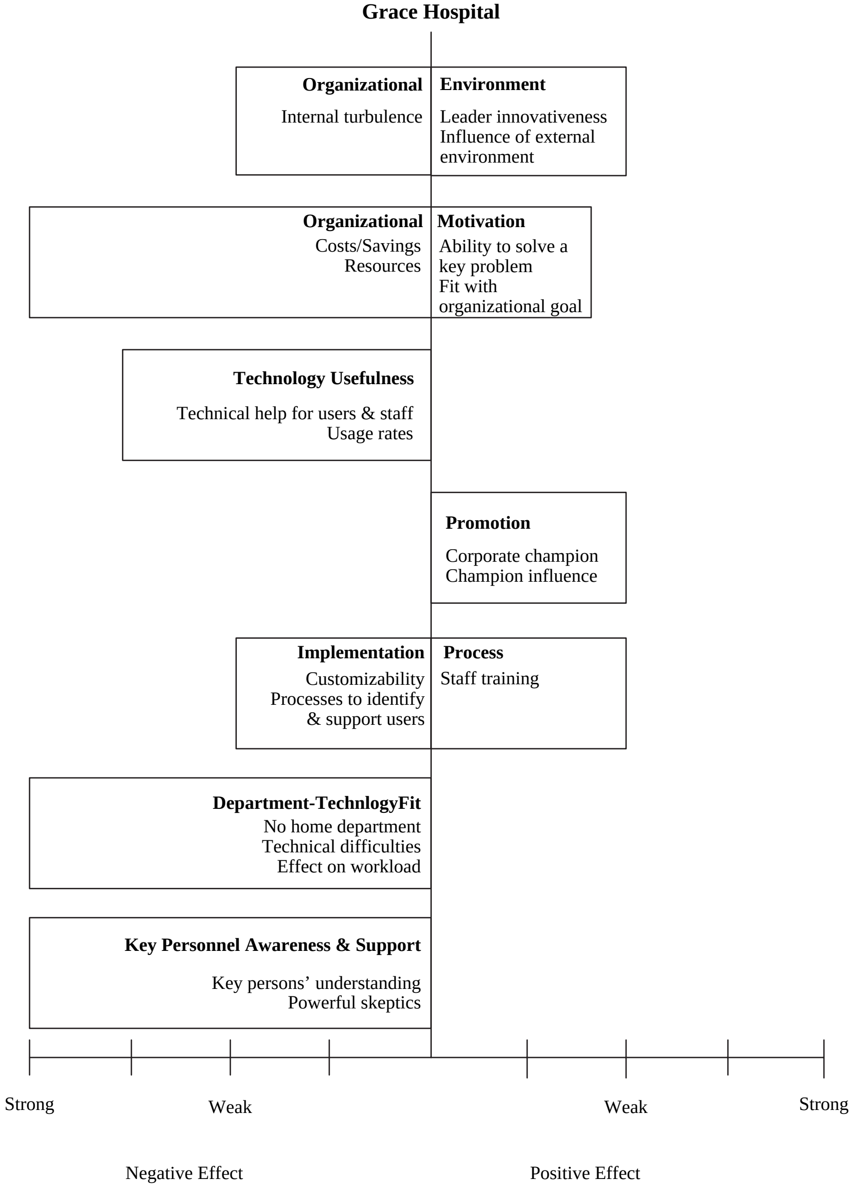
Grace Hospital is a highly specialized, tertiary care referral center in a major Canadian metropolitan area. The hospital enjoys a reputation for excellence and innovation, and has been designated as a Center of Excellence in its province in the areas of heart and kidney disease, and in HIV/AIDS treatment. This case study illustrates the important role an enthusiastic "champion" can play in implementing an interactive health communication system (IHCS). Internal issues were also a significant factor in determining CHESS's ultimate adoption. These included health care funding, physician acceptance, patient acceptance, turf wars, staff turnover, and competing priorities. This study describes events that took place over a four-year period.

## 10.1. Description of the Environment at the Site

To fully understand Grace Hospital's experience, it is first necessary to understand the turmoil occurring in the publicly funded Canadian health care system in 1996. A shrinking Canadian treasury led to government mandated cutbacks, mergers, and internal restructuring of many health care facilities throughout the country. For Grace, that meant merging with several other hospitals under a single umbrella. Integrating systems, personnel, and organizational cultures was predictably difficult in that different hospitals had different missions and approaches to health care provision. These issues kept senior management preoccupied refereeing disputes among the merged organizations. Adding to the turmoil were substantial cuts made in the ranks of middle management. As positions were eliminated, younger staff members were the first to go. Coupled with a serious shortage of nurses in Canada, Grace found itself with a staff of older doctors and nurses, inadequately supported.

Canada's health care system, unlike that of the United States, is designed to triage the sickest patients with a given disease to the tertiary care facility designated as the province's Center of Excellence for that disease. Grace was recognized as a Center of Excellence in the care of patients with heart and renal



disease as well for people living with HIV/AIDS. This resulted in certain designated departments of Grace treating sicker patients from more distant regions.

Patients were discharged while they still faced significant disease management issues, which were resolved on their return home where local providers in remote regions of the province managed follow-up care. Grace providers had no further contact with them at this point.

The CEO of Grace at the start of the implementation was a manager with clear focus and high expectations. His leadership complemented a staff that was also dedicated, competent, and mission-driven. When budgets were cut, and they often were in those days, staff simply looked for new ways to "do more with less."

The CEO was also an innovator and an admirer of technology. It was his conviction that technology played a significant role in Grace Hospital's designation as a "Center for Excellence." Being an innovator in technology had other positive consequences as well. It demonstrated to staff and other interested observers that Grace could move forward while still downsizing and reorganizing.

The CEO of Grace had been promoted from the position of the hospital's Vice President of Medicine. As the new CEO, he appointed an admired and respected colleague to be his Director of Medical Education. The position was as natural for her as it allowed her to address what she perceived to be a weakness in the hospital's patient service, namely follow-up care for cardiac patients when they were dismissed from the hospital.

Throughout Canada, a shortage of nurses, physicians, and shrinking budgets led to a reduction in services, and necessitated an increase in efficiency. Some staff members felt patients were left with unmet needs upon discharge and that follow-up communications were inadequate or non-existent.

This "knife-to-door" approach, as some nurses called it, was especially troublesome for cardiac patients because of the chronic nature of their illnesses. Cardiac patients are frequently called upon to change lifestyles in order to maintain heart health. Diet, exercise, and medication had to be carefully coordinated in order to give the patient the greatest benefit. In Canada, however, when a rural patient left a large hospital like Grace, there was no effective means in place to provide adequate follow-up care.

## 10.2. Timing in the History of CHESS

At the time Grace Hospital became involved with CHESS, the system had been established and was continuing to be improved and modules added. Research was ongoing, and the CHESS research consortium was growing. When Grace joined the consortium there were already five members and three more member organizations joined over the next year. CHESS continued to be presented at conferences as an innovative approach to patient education and support. The breast cancer module was already in use, and new modules such as heart disease and Alzheimer's were in the later stages of development. Grace Hospital joined the consortium just about a year before the transition to the Internet took place. As they began implementation, CHESS still needed to be loaded on individual user computers as a stand-alone Windows system, but the transition to Internet-based CHESS was soon to follow.

## 10.3. Early Exposure and the Decision to Adopt CHESS

The newly appointed Director of Medical Education began planning an initiative for patient education and outreach. Earlier, while attending a patient education conference in the United States, she met the founder of CHESS. As a result of the meeting, she focused on the use of innovative technology to facilitate her goal of enhancing patient education at the hospital and is from here on considered the champion of the technology.

She discussed the possibility of bringing CHESS to Grace by joining the CHESS consortium that researched and evaluated these types of systems. The CEO had some familiarity with these systems and gave her his approval to proceed. She approached her CHESS contact in the United States and arranged to have some Grace clinicians review the system that the research group had developed. Later that summer a presentation was made at Grace to key opinion leaders among physicians, nurses, and educators. They were favorably impressed and expressed their enthusiasm for computerized interventions that addressed the needs of cardiac and HIV/AIDS patients.

As a Center of Excellence in Cardiac Care, it was a natural progression to develop a system customized for cardiac patients because of Grace's enhanced role in providing province-wide cardiac care. The champion enlisted support for CHESS from the new program administrator of the inpatient Cardiology Unit who was very enthusiastic about the project. Their vision was for an IHCS that would extend the reach of the hospital to patients awaiting surgery or who lacked access to cardiac rehabilitation following surgery.

Undercutting the vision, however, was the ever-present problem of funding. Enthusiasm for CHESS was one thing; paying for it was quite another. There was no place in the budget to draw funds for CHESS, so the corporate champion and the administrator were left to their own devices if the system was to move forward. Together they enlisted some financial support from the provincial Heart and Stroke Foundation. They hashed together a grant proposal for a donation of computers. The encouraging news and the show of support within cardiology convinced the CEO to pay the fee for Grace to join the research consortium.

No sooner had Grace joined, however, than the champion took a temporary position with the provincial university medical school. She maintained ties with Grace but was less visible and available to staff there. Nevertheless, her interest in CHESS remained strong and she arranged to have a portion of her salary go to a full-time CHESS coordinator and a secretary for the CHESS implementation.

The CHESS coordinator would have to be a person who could manage the project as well as manage the various personalities involved. What was needed was a take-charge kind of person who knew when to press down on the accelerator and when to let up. They found it in a nurse who had considerable management experience and was a personal friend of the champion.

The newly appointed coordinator wasted no time immersing herself in the project. She traveled to the home base of CHESS in the States and familiarized herself with all aspects of the system. She befriended the developers and technicians who would provide back-up and service. She took advice on developing marketing strategies. In short order, she knew as much about CHESS as anyone at Grace.

Although the coordinator was good at looking ahead, her crystal ball could not have foreseen that shortly, Grace Hospital would acquire a new CEO. Nor could it have tipped her off that at about the same time the old CEO departed, so too would the champion move permanently to the medical college. The new CEO was less enthusiastic about CHESS than his predecessor. He had bigger concerns and they were mostly associated with the hospital's merger and restructuring. CHESS was stalemated, at least for a while. In spite of the demands of her new academic position, the champion continued to provide active support for CHESS, including seeking out grants that brought money and sparked clinicians' interest in the project. It was important that she had a long history at the hospital and was a respected family practitioner. This added to her credibility as did the fact that she was well liked by staff at all levels. Nonetheless, the project suffered without her daily presence or regular accessibility at the hospital.

The new CEO moved the entire CHESS project under the Director of Nursing Informatics. The Director was enthusiastic about CHESS but suffered the same obstacles as her predecessors, namely money. The pulse of the project weakened even further when funding for continued membership in the research consortium was nearly cut. Participation in the consortium was the only way Grace could successfully implement CHESS and it took persuasive and determined efforts to keep Grace in the game. Persistence and insistence finally paid off and funding was granted, albeit six weeks late.

Despite the problems, clinical staff and supporters of interactive health communication systems agreed the time was right for CHESS. In addition to patient demand for more information that could be accessed at home, the Canadian budget crunch left health care providers looking for cost-saving technologies.

### FOCUS ON: *Cooperation Within and Between Departments*

One top administrator cited the advantage of having both a physician and a nurse champion the project together: their collaborative relationship symbolically bridged that status gap. But conflict as a result of restructuring also affected implementation. For example, the cardiac head nursing position was divided into two middle management roles (patient care leader and program manager) that required close coordination with one another. In many cases this meant working through conflicts resulting from dividing the former "turf" of the head nurse. Early efforts to implement CHESS in Cardiology were affected by this when an early supporter for the system left the unit.

## 10.4. Implementation of the Heart Disease Module

### *10.4.1. First Implementation Trial in Cardiology*

Under the direction of the Director of Nursing Informatics, the champion and the CHESS coordinator agreed to participate in a CHESS consortium-sponsored pilot research test of the new heart disease module. To participate in the pilot, they applied for and received a grant for additional funds from a provincial research foundation. The pilot involved recruiting patients to a randomized controlled trial of the module, training those who received computers in use of the heart disease module, installing computers in the homes of patients who did not have their own computer, and following up on patient surveys sent out from the United States. CHESS at the time was implemented as a stand-alone Windows product.

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FOCUS ON: *Physician Buy-in*

Cardiologists at Grace had already reviewed the cardiac content and revisions/additions were made to fit with Canadian practice protocols. Thus it was easier to get support for conducting the pilot. Physicians were confident that CHESS provided quality information.

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Recruitment for the CHESS study was set up to be run parallel with the unit, that is not integrated into the regular workflow. However, nursing staff did need to be involved as the initial contact point with the patients. Patient recruiting proved difficult in the Cardiac Unit, which was among the hardest hit by the restructuring. It was expanding services to handle an increased patient load of more complex cases while simultaneously cutting back on staff. Several nurses took maternity leave at the same time and several left as a result of burnout. Nurse educators were eventually hired to help train staff to handle the more complex cases but the impact had taken its toll.

In this environment, it was difficult for staff to be enthusiastic about an innovation (CHESS), especially if it added to the workload in any way. In the other 30 cardiac studies running simultaneously, research staff did the recruiting so the nursing staff was not used to asking patients to participate in studies. At the same time, the enthusiastic Director of Nursing Informatics left Grace, and her replacement lacked enthusiasm.

Initial recruitment was extremely slow, and the CHESS coordinator worked hard to develop a recruitment method that would work in that environment. A new strategy was developed to take the burden off of the front-line staff, though it did prove to be time-consuming for the coordinator. First, she did a series of in-service trainings to familiarize nurses on the floor with the CHESS system. She scheduled these for the slowest times of day. She also developed recruitment procedures to ease the recruiting burden: special handouts for the patients, and checklists and other tools to make recruitment easier for the nurses. She checked new inpatient charts every day, asking nurses about potentially eligible patients. She made friends with the clerical workers on the floor, who helped her find referrals.

Staff nurses played a special role in recruiting patients to test CHESS. The coordinator believed the personal involvement and in-service training about the value of CHESS and the study was vital for obtaining recruits. This personal attention helped to mitigate the sense of overwork and complemented the support for the project from top management and cardiologists. While the nursing staff felt that CHESS might help their patients, their primary focus was on inpatient needs, not on follow-up care. The "knife-to-door" mentality, partially necessitated by the new shorter patient stays and intensive inpatient care required by the fast tracking of cardiac bypass surgery, left little time or resources for attention to follow-up care.

To complement the pilot test of CHESS, the champion engaged a medical student in doing a series of qualitative interviews exploring how patients used CHESS. Additionally, researchers at Grace generated several reports regarding their experiences using CHESS to present at Canadian conferences. These presentations enhanced their reputation as a leading innovator in the area of computerized patient education and helped with receipt of future funding. Recognizing that the responsibility for provision of after care was in smaller regional facilities, the Grace Cardiology group and the champion facilitated a larger research study of the CHESS cardiac module with rural patients.

FOCUS ON: *Effective Referral and Support Processes*

Staff felt that involvement in research was both positive and negative. While research enhanced the credibility of CHESS and gave valuable information about outcomes, it also made it more cumbersome to recruit patients. In a unit such as Cardiology that was already overworked, understaffed, and involved in numerous other studies that competed for the patient subject pool, implementation was significantly hampered by involvement in research. However, it is unclear whether the unit was prepared to be involved in implementation outside of research, unless the process really required little or no effort on the part of staff.

## *10.4.2. A Rural Cardiac Implementation*

A year later the champion applied for and received a second government grant to study the impact of CHESS on a rural population. At this point the CHESS Heart Disease module was converted to be accessible via the Internet rather than as a stand-alone Windows product. This change made it easier to deliver CHESS to patients, as long as they had a computer and Internet access. While the grant was administered by Grace, where a large number of cardiology patients received follow-up care in rural areas, the study was actually based in the Cardiac Department of a smaller regional hospital.

The regional hospital where the rural implementation of CHESS was based is a major center about 500 miles from Grace. It functioned as a referral center for most cardiac procedures with the exception of open-heart surgery. The CHESS project provided an advantage to top administration at the regional hospital because involvement in a research project cast them in a positive light as being academic and innovative.

All departments within the hospital appeared to work well with one another and communications appeared open and candid. Despite the difficult financial climate, there was little bickering over resources. There were approximately 250 physicians on the staff, half family practitioners and the other half specialists. The entire Department of Medicine met monthly, and three times a year all departments met together.

One of the cardiologists at the regional hospital had previous knowledge of CHESS through his daughter who had worked on a qualitative research study of the system at Grace. Additionally, the project fit well with the goals of the cardiology division. It enabled them to offer patients additional cardiac education and support for which they otherwise lacked funding. They believed CHESS would benefit a number of their patients living in remote areas without access to cardiac rehabilitation. Patients who went to a rehabilitation facility would also benefit by having education and support materials available at home as reinforcement. This also provided a positive alternative to counteract inaccurate information many of their patients were getting from the Internet.

The grant provided resources to hire additional staff to implement the recruitment, training, and evaluation. However, if the regional hospital had needed to provide any funding, they would not have been able to participate. The connection to the Grace Hospital champion and the link with the opinion leader in cardiology in the regional hospital helped give credence to the project.

A further advantage for the project was the team-oriented culture within the regional hospital Cardiology Group. The group referred to itself as “one practice” of five cardiologists, nurses, receptionists, and technologists. Everyone shared in decisions, and most new projects were taken on only if the whole team agreed. In short, the unit had a history of cooperation in a very collaborative environment. Because a cardiologist (instead of someone outside the unit) initially introduced the project, staff was more accepting of it. After this introduction, the champion came to the unit to demonstrate CHESS and explain the project. A demonstration of CHESS helped increase acceptance as well.

A physician’s only involvement with patient recruitment was to agree that his or her patients could be enrolled. For staff nurses, however, recruitment was a team effort. The admitting nurse would determine initial eligibility by inquiring whether the patient had a computer. Because all patients received some form of patient education while they were in the recovery room following their cath lab procedure, this was an opportune time to approach them about the study. A surprise to many of the staff was that so many patients, even elderly ones, had computers and Internet access. The recovery room nurses saw the project as facilitating their goal of providing better patient education. All in all, they only had six refusals out of 136 approached at the two sites. An unexpected benefit was that the study further raised staff awareness and interest in patient education, leading to the development of a new cardiac rehabilitation program.

Shifting schedules was difficult, as was finding additional staff to take over when an existing nurse shifted 50 percent of her time to take charge of recruitment for the project. Training subjects and administering the initial survey could add as much as an hour to the time patients remained in the cath lab following their procedure. It was important, therefore, to have a person who could dedicate time to the process. The nurse in charge of recruitment felt that the best way to institutionalize CHESS and make it a regular part of patient care was to have it integrated into the cardiac rehabilitation program or some type of patient education program. Additionally, because the research nurse was a member of the clinical team, dissemination of experience and findings occurred constantly through informal discussion.

## 10.5. Implementation of Other CHESS Modules

Concurrent with the implementation effort in cardiology, several attempts were made to use other CHESS modules for populations served by Grace.

### *10.5.1. Living with HIV/AIDS Module*

A group of physicians and nurses working in HIV/AIDS reviewed the content of the CHESS HIV/AIDS module and concluded it required considerable revision to fit treatment protocols in Canada. There were additional political problems with bringing the module to Grace. A powerful local AIDS group, for instance, was planning a program of its own and saw CHESS as competition from across the border. Additionally, caseworkers in the urban area felt a computer-based system was not a viable way to support a population with a high percentage of homelessness or people with no regular permanent residence, many of whom were too strung out to comprehend the material. Because of the lack of support from the local AIDS group and CHESS not being appropriate for the population that needed to be served, this CHESS module did not get implemented.

### *10.5.2. Module for Caregivers of Persons with Memory Disorders, Alzheimer's, and Other Dementias*

The coordinator had developed a good working relationship with other affiliates of Grace in the metropolitan area who were involved with day care and residential care for Alzheimer's patients. They had expressed a strong interest in using another of the CHESS modules for Alzheimer's caregivers. A grant proposal to pilot test this module was submitted, but was not funded. Without this support, there were no funds to develop the needed Canadian content and a local resource directory, so further attempts to implement this module were put on hold.

FOCUS ON: *Departmental Champion Support*

Developing clinician support at the department level was a major hurdle throughout the implementation efforts. In the HIV arena, one outreach nurse at Grace believed the CHESS module could benefit education and support efforts in outlying areas of the province with poor access to care, but she was too busy with a major new project to champion the cause. There was little support for the CHESS project at the top levels of the department. Those lower in the hierarchy were hesitant advocates – they felt a physician would have to champion a push to try the system through a research study, but no physician showed an interest in doing this.

With the Alzheimer's module as well, the champion had worked hard to build a successful collaboration among the providers interested in testing the module, but no active champion among them came forward to help with grant preparation or design of the research. So without funding, local interest waned rapidly and no one stepped forward to carry on the search for resources.

### *10.5.3. Living with Breast Cancer Module*

A breast cancer nurse in the community had inquired about disseminating the breast cancer module in the metropolitan area. The nurse had broad contacts among most of the clinicians in the area (breast cancer nurses, surgeons, and oncologists). It was decided to hire her one day per week to help disseminate the breast cancer module, even though Grace was not the major facility for cancer patients in the province. Through the strong leadership of the breast cancer nurse, the breast cancer module was effectively integrated into the practice patterns for patients in several hospitals and clinics in the urban area. Referrals were not large but they were steady and increasing. Patients indicated enthusiasm for using the system and some patients began to be referred by other breast cancer survivors who had used and benefited from it.

### *10.5.4. CHESS Coordinator Changes*

The corporate champion and the CHESS coordinator were having an increasingly difficult time obtaining funding to support the implementation of CHESS at Grace. They were eventually told they would have to find funding for the system elsewhere before the year was over. That spring, the CHESS coordinator was recruited to head the renal program at Grace. The corporate champion met with the Director of Nursing Informatics to discuss how to restructure the project in light of reduced funding and reduced organizational commitment. With the cardiac research project underway recruiting rural patients, they decided to try to move this module from research into full implementation in the city. They hired a part-time coordinator two days a week to market the system among community physicians in the metropolitan area, and to increase demand for the module within the hospital but outside of research.

The loss of the original coordinator proved a major blow to the project. The new CHESS coordinator lacked the initiative and managerial skills to market the system without more supervision, and was unable to move any CHESS project forward. The nurse who came on board to help disseminate the CHESS breast cancer module also complained of a lack of support and leadership for the system, but she was able to move forward with recruitment in spite of this, primarily because of her extensive contacts within the community.

The new CHESS coordinator left the position by mutual agreement within one year and was not replaced. The breast cancer nurse continued with dissemination, but felt the lack of support since she was only available to recruit one day a week. Despite the limitations of her time to work on CHESS, she had a substantial amount of success in getting CHESS to breast cancer patients.

This breast cancer nurse was eventually hired as the third CHESS coordinator. Her 20 years of experience plus her familiarity with doctors and nurses working in breast cancer throughout the metropolitan area helped her immensely in recruiting patients. Her general expertise within the hospital domain also helped her to coordinate projects (e.g., heart disease) that were not her immediate area of expertise. Her ability to provide feedback and guidance in use of CHESS to other areas of the hospital was invaluable in facilitating implementation efforts.

## 10.6. Analysis

The following factors in the model described in Chapter 5, Implementation Model Development and Testing, played the biggest roles in the outcome of the CHESS implementation at Grace.

### *10.6.1. Organizational Environment*

The high levels of turbulence in the health care environment at the time of this implementation had both a positive and a negative impact on its success. On the one hand, top management saw the potential for the system to resolve problems in providing support for patients awaiting surgery and in follow-up care for patients with chronic diseases or in fragile condition upon discharge. On the other hand, staff shortages and problems of dealing with more critically ill patients made it difficult to encourage front line staff to look beyond their existing problems of delivering acute care. It was hard for staff to see how CHESS would make their jobs easier, or how it could be integrated into an ongoing care management system.

These problems, and others associated with the downsizing and mergers taking place, became more immediate management concerns over time, and implementing a new technology moved down the list of priorities.

## *10.6.2. Organizational Motivation*

In the early phases of implementation, the CHESS system fit well with the goals of the CEO – to be on the cutting edge of technology in keeping with Grace's position as a Center of Excellence in the province. It also fit with the goals of the main champion – to provide cutting edge education and follow-up care to patients.

The system fit with other key goals as well. Some staff members saw opportunities to do research with CHESS as a way to boost the hospital's overall reputation as a cutting-edge facility, both nationwide and throughout the province. They saw it as potentially enhancing their competitive advantage in obtaining health ministry funding for programs. Again, however, translating enthusiasm for doing research with CHESS down to the departmental level required a great deal of effort in order to overcome covert turf concerns.

Administrators and clinicians alike also expressed concern about the potential for patient misinformation being transmitted over the Internet. They welcomed CHESS as an alternative Internet source that was credible and could provide safe and helpful information to patients.

But regardless of top management's level of spoken support, resources were continually tight, and the champion spent a great deal of time seeking funds through outside grants to support the initiative. Lack of a reliable source of resources was a constant burden for the project. Lack of resources also made it difficult to provide ongoing feedback from patients to clinicians, yet feedback was critical to obtaining ongoing support for the system.

The high cost of fees to belong to the research consortium, and the high cost of developing new modules, was viewed by some as barriers to use.

## *10.6.3. Technology Usefulness*

### 10.6.3.1. Affordability

The lack of access to computers among some patient groups limited the availability of CHESS. In a country with universal health care, it is harder to accept a system that is not universally available. This complicated obtaining grant support because grantors foresaw significant future costs to make the system universally available should the research outcomes prove successful. As one doctor explained "It's hard to justify providing computers to those without them when there is a waiting list for bypass surgery." That is, it is unlikely that dollars for traditional health care services would be or could be used for purchasing computers for patients to use.

### 10.6.3.2. Convenience and Ease of Use

The champion also felt that the instability of patients' technical infrastructure, including Internet access, interfered with implementation and quite possibly affected the ability of the trials to obtain harder outcomes. She stated that national strategies to introduce broadband technology widely to isolated communities are needed before a sustainable and widespread implementation can be achieved. On a more positive note, the breast cancer coordinator reported that breast cancer women participating in the discussion group had developed a strong camaraderie, even choosing to meet face to face.

The two cardiac studies found that people who lived alone or who lived too far away to attend the cardiac rehabilitation program offered at Grace were the heaviest users of the system. This was a positive outcome, indicating the system was being used most by the audience initially believed to be most in need. However, the two trials were not able to show that patients made significant behavioral health changes. The rural trial showed some indication that patients became more interested in seeking information about their health over the Internet, and patients reported they generally liked using the system. The trial was adequately funded and the rural hospital group was enthusiastic about the system's potential, so the research study went smoothly. However, without stronger behavioral outcomes additional funding was not available to fund the system for everyone, so digital divide issues affected future funding decisions.

## *10.6.4. Promotion*

### 10.6.4.1. Building Support for the Technology

Planning for the implementation of CHESS involved both top management and individuals with expertise in the given disease. Physicians or clinical nurse specialists reviewed each disease-specific module under consideration for adoption in the appropriate specialty. This type of review was a crucial step toward obtaining clinical staff buy-in for the technology but, by itself, was no guarantee of their support. Covert turf battles and other political considerations as well as concern over the appropriateness of the system for their inpatient practices also affected support.

### 10.6.4.2. Corporate Champions

A well-liked and dynamic champion can keep an implementation alive even under adverse circumstances. Several staff mentioned the importance of the Director of Medical Education as the major overarching champion of the technology. She was instrumental in convincing the CEO of the importance of the system and in bringing a group of opinion leaders together for a demonstration of CHESS. Even after she stepped down from her administrative role at the hospital to take a full-time academic position, she continued to actively support the system as a way to provide outreach and follow-up for patients outside the hospital setting. Additionally, her work writing grants to supplement funding for CHESS was a key to its survival.

Despite the continued presence of the original champion, one of the clinical nurses involved with the implementation also felt the lack of a physician champion. Even though the champion was still an opinion leader among the staff physicians practicing at Grace, this nurse felt the project needed direct physician involvement from the current management ranks at Grace to raise its profile and priority.

#### 10.6.4.3. Department Champion Existence

The implementation also suffered when no local departmental champions for CHESS stepped forward. A number of staff mentioned the importance of having a "local" champion at the department level. This was generally missing in all implementations at Grace.

### *10.6.5. Implementation Process*

#### 10.6.5.1. Implementation Roles

The role of CHESS coordinator was established early on at Grace Hospital, but turnover in the position was an issue. The initial CHESS coordinator was a nurse with a strong management background who knew how to work independently and get things accomplished in a large hospital organization. Her importance in getting the project up and running cannot be overstated. Her departure, coupled with the lack of funds to hire a full-time replacement, dealt a serious blow to the project.

Her replacement lacked the knowledge of the hospital setting and she lacked the skills to market the system independently. Under her direction, the project floundered and goals to spread it to local physicians in general practice were never achieved.

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LESSONS LEARNED: *Customize Technology*

Organizations need to be able to customize, add to, and generally make an interactive health communication system (IHCS) their own if it is to continue to expand and grow. This is particularly true for implementations that occur in different countries and different health care environments. Attracting physician champions to these tools might be easier if they know they will be able to "adjust" the tool to their own patterns.

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#### 10.6.5.2. Training to Use the Technology

Staff members commented on the importance of clinicians having adequate training in the specific technology for which they were recruiting patients. This, however, was an ideal, not reality. It was also difficult to find the resources to train users. One coordinator mentioned the difficulty of providing "hands off" training over the phone rather than in person even though such training is now shown to be superior to face-to-face training. Others mentioned the importance of proper training for the coordinators, but indicated it was not always available to them.

### 10.6.5.3. Process to Identify, Refer, and Support Users

The CHESS coordinators as well as the nurses on the floor emphasized the importance of a simple patient-enrollment procedure in order to avoid adding to an already intense workload. Anything more than passing out a codename and password was viewed as too burdensome, and suggested that the process require very little coordination among different members of the health care team. The time commitment involved in taking computers to users' homes and training patients in use of the system was also beyond the resources available to most departments. Later recruitment efforts were limited to patients with computers.

Implementing the system initially through a research study in some instances helped to build support, but in others created some roadblocks. It was necessary to either involve or get the blessing of researchers within the department who were already busy with their own research agendas. This proved easier to do in some areas than others. In at least one instance, the inability to interest the department head in research on CHESS was a major factor in its failure. Conversely, in another case, helping a researcher do a project with CHESS that interested her helped facilitate further joint work. Research studies can raise covert turf concerns. Implementations went more smoothly when the project meshed with the research interests of some of the people in the department. An unanticipated side benefit was the prestige Grace received for being on the forefront of computer-based patient education.

The nurses in some departments were not particularly enthusiastic about introducing CHESS as a research project, though they realized it was a good way to get initial funding. One nurse stated she felt that research slowed down her ability to get the information contained in the system to her patients. Another was concerned with the extra cost associated with having to determine eligibility, recruit the patients, and also send out follow-up surveys. Her department had declined to participate in one pilot because the cost was too great and there was insufficient funding for the project.

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LESSONS LEARNED: *Implementation Process*

Physicians liked the prestige of being involved in a research study, and liked the idea that research helped to fund initial dissemination. Also, doing research was something most clinicians were familiar with and saw as important, which increased their comfort with the implementation. Because Grace is a research-intense hospital, there is an organizational commitment to research that supported the early research-based implementation.

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## *10.6.6. Department–Technology Fit*

### 10.6.6.1. Fit with Other Services/Procedures

Implementing an interactive health communication system (IHCS) that was developed in the United States in Canada presented special problems. Clinicians had concerns that CHESS would not fit with their approaches to practicing medicine because of significant differences between the United States and Canada. These types of IHCS need to be easily adapted to the culture using them.

Some modules seem more easily implemented in a hospital setting while others are more appropriately implemented as part of a community practice where they can be integrated into ongoing chronic care management. For example, implementing the heart disease module in a unit where there is little or no follow-up care for patients is much more challenging because the system cannot be easily integrated into ongoing care management. Both physicians and nurses could see a place for the technology within a number of existing and valued programs that had more focus on patient follow-up care (e.g., cardiac rehabilitation and asthma). Despite the existence of CHESS modules in these areas, CHESS was not initially a part of these Grace Hospital programs and thus could not be a part of integrated care. As a result, staff felt CHESS was “forgotten” in the everyday routine of care.

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LESSONS LEARNED: *Good Fit with Other Services*

Modules geared to helping patients manage a chronic condition, such as heart disease, need to be implemented in practices that provide long-term follow-up care for patients. If they are introduced to patients in a hospital setting, then there needs to be a high level of integration of care and collaboration among providers.

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### 10.6.6.2. Effect on Staff Workload

One of the major obstacles to making CHESS a routine part of Grace Hospital was the extra work required to recruit and train subjects. Staff clearly saw an advantage for use of CHESS, particularly for patients on waitlists for surgery, or who returned home to rural areas with little access to aftercare. Nonetheless, the overriding needs of providing acute care with shrinking resources to a growing number of sicker patients often overrode concerns about helping these patients after discharge.

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LESSONS LEARNED: *Importance of Home Department*

Early versions of CHESS were especially labor intensive to implement. Recruiting and training patients, providing computers, and educating novice users, as well as handling technical difficulties, were among the problems. The likelihood for success is enhanced when a patient education department that sees CHESS as part of its mission absorbs some of these functions. Several implementation coordinators specifically mentioned that if the system were housed within a "home" department, resource support would be easier. Without this support, each individual department that chose to implement CHESS had to find its own funding. The Canadian system fortunately provided a mechanism for this through grant requests to the Ministry of Health. And while physicians and researchers were used to the process, applying for a grant was still time consuming, with no guarantee of success. Once again the critical role of a champion comes into play.

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## *10.6.7. Key Personnel Awareness and Support*

Through the introduction of CHESS, clinicians became more aware of how the Internet was used by their patients for information and support. They also recognized the potential for effective and accessible patient education through distance technology.

### 10.6.7.1. Key Person's Understanding of the Implementation

For physicians, the distance from the center of CHESS development, and the lack of personal connection to the CHESS developers reduced their interest over time. Because of the distance they had little or no opportunity to discuss theoretical issues, gain experience in implementation, or discuss research questions with the developers. Without their program staff being involved with the CHESS developers, there was little diffusion of ideas and enthusiasm on a regular basis.

### 10.6.7.2. Clinicians Encourage System Use

There was agreement that physicians generally did not buy in and take ownership of the system, and that this had a dampening effect on recruitment. Nurses felt it would have made a significant difference had physicians actively encouraged their patients to use the system. At Grace, CHESS generally had little impact on clinical staff. In cardiology, the department with the most usage, the coordinator reported that most of the staff in the in-patient areas did not even know about CHESS because it was given to patients as they left the hospital.

## 10.7. Conclusion

While this implementation of CHESS was not successful, there were some unanticipated side benefits from use of the system. The champion felt that adoption of CHESS helped the organization learn about using technology as an aid to patient care and to move further into this area. Also, the reports made at professional meetings across Canada enhanced the hospital's reputation as an innovator in using technology for patient care, which made it easier to obtain more funding for new technology-related programs. From this perspective, use and evaluation of CHESS brought further prestige and funds to Grace.

However, the clinical consequences of use of the CHESS heart disease module were less than desired. At the conclusion of this study, CHESS was being offered through the cardiac rehabilitation program at Grace and was available on the cardiology unit in a special library area accessible to patients and their families. While staff had a positive overall reaction to the system, there was no enthusiastic champion for it within the cardiology realm.

While Grace cardiologists in general were only lukewarm to CHESS, a PhD student in kinesiology in the cardiac rehabilitation program became interested in the concepts of distance cardiac rehabilitation supported by Web-based patient education and support. When he completed his PhD, he became a faculty member at a local university and part of the clinical team at Grace's cardiac rehabilitation program. He used his early experience with CHESS to develop a research program on the use of case-based cardiac rehabilitation delivered over the Internet with patient education and support.

With external funding and the engagement of multi-disciplinary health care providers from the cardiac rehabilitation program, as well as a strong and motivated internal champion, this new development flourished. Grace piloted the use of a Web-based program with educational content, health care tracking accessible to patient and provider, and a multi-disciplinary and case-based approach to individual patients. Use of the initial technology (CHESS) appears to have spurred interest in the medium as a tool for patient education. It prompted Grace down the path of developing its own systems led by an interested and influential champion with time to devote to the project.

However, long-term outcomes from an early CHESS implementation are harder to measure and may take years to come to fruition. For example, the current initiative in the cardiac rehabilitation program, triggered by an early exposure to CHESS, may be sustained and spread to other clinical areas. By the time this successful implementation occurs, its roots in an early less successful implementation may be lost.

# 11
# Simpson Hospital, 1997–2000

Pauley R. Johnson, Susan Dinauer, Gail Casper,
and John Fellows

Simpson Hospitals and Clinics is a large, non-profit tertiary-care facility in the Midwest. Its reputation for excellence brings patients from far outside its geographical area for treatment and for second opinions. Simpson's unique culture and management style make it an interesting study of implementing a new technology into a very large organization that prides itself on consensus building. The consensus approach to approving any new innovation in patient care is a unique blending of the structure, process, and content elements of our model. It enables top management to be clear about the potential benefits of the innovation, what it will take to implement, and its impact on the total patient care experience, prior to adoption. This approach assured adequate resource support from the beginning and enhanced awareness of the CHESS system. It also presented significant challenges in spreading the system.

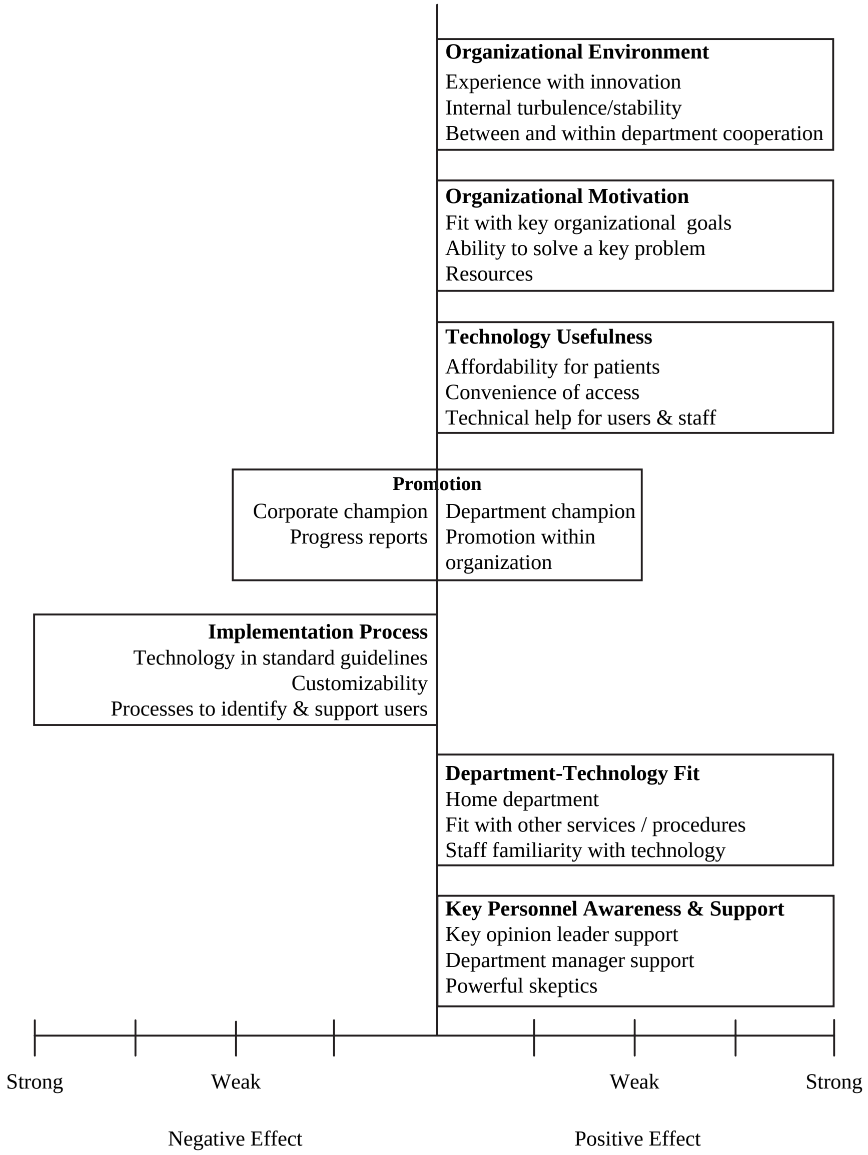
## 11.1. Description of the Environment at the Site

Simpson considers itself to be very innovative – new ideas are embraced if they are proven scientifically and aligned with the Simpson mission for patient care. The clinic also had a 90 percent success rate for its quality improvement projects. One senior leader described the organization as an early adopter rather than an innovator, preferring to wait until some initial test of an innovation outside the organization showed its promise. This characterization fit with the adoption of CHESS.

CHESS was an excellent fit with Simpson goals and values on many levels. It fit with a hospital-wide initiative to enhance patient education. It facilitated the ability of the patient education department to move this initiative forward in creative ways. It fit with the values of many health educators and others to provide patients access to information and social support whenever and wherever they needed it. Many Simpson staffers were sold on the technology because of testimonials from patients who found the social support particularly helpful in the acute stages of their disease.

In addition, it provided an opportunity for Simpson to expand its expertise in Web-based provision of health information at a time when they had plans to expand their own website.

**Simpson Hospital**



Innovation at Simpson is offset by the reality of the size of the bureaucracy and the committee- or consensus-based structure. Simpson is a non-hierarchical (horizontal) organization relying on a consensus-driven committee structure to move projects ahead. This system hinders speed and flexibility, but provides some simplification because there is an accepted process to seek approval for new projects. The process also assures that the organizational impact of any project is assessed since functions are integrated across many areas.

Also, ideas that have been discussed and approved by multiple constituencies have more buy-in from staff and it is easier to get additional resources approved if necessary. However, the extensive approval process is not designed for the faint of heart or those without a solid working knowledge of the Simpson system (or a mentor with such knowledge). Several physicians mentioned that the time it took to get a project approved was a deterrent to championing one. On the other hand, it assured that those who chose to seek approval for new ideas were clearly committed to their projects.

One physician interviewed characterized a successful project champion as a person who is “politically savvy, well connected, and a good marketer.” Patience and persistence is also necessary. As one of the senior leaders said, “It’s not important that you make decisions at Simpson, it’s important that you know how to get things done.” The Steering Team that obtained the initial approval for CHESS had all of these elements. Their extensive experience in the organization and highly respected status as researchers and health educators was a distinct plus in obtaining approval.

## 11.2. Timing of Implementation in the History of Chess

At the time of the implementation at Simpson Hospital, CHESS was still considered innovative and was being presented at Quality Improvement conferences, which was how Simpson staff heard about it. Simpson joined the CHESS research consortium as the final organization in a “consortium growth spurt.” There were seven other member organizations at the time.

Simpson Hospital joined the consortium just before the transition to the Internet took place. At the beginning of the Simpson implementation the breast cancer module was well established, but not yet available for open enrollment. A module for HIV was available as well, which Simpson would implement as a research study. Development of a heart disease module was underway, and was just getting started for a prostate cancer module.

### *11.2.1. Early Exposure and the Decision to Adopt CHESS*

Several influential physicians and quality improvement professionals at Simpson attended a conference on health care quality improvement. There they heard a presentation by the CHESS founder, on using computer-based health support for breast cancer patients. The quality improvement movement in health care was gathering momentum at the time, and providers were beginning to identify a newly emerging need to help patients obtain high-quality information about their health and health conditions. After hearing the presentation, the Simpson group began to think about ways computers and the Internet could help achieve this goal. One medical director clearly stated the meeting clarified this goal for him:

"I was at a quality improvement meeting when [they] brought up this computer education thing…and the perceived need to improve patient directed access to information about their health problems and health condition".

Although Simpson already used the Internet to provide health information for patients, these clinicians were intrigued with the possibility of offering more interactive features such as social support and decision aids, and of helping patients partner more fully with clinicians in managing and making decisions about their illness.

Upon their return they discussed these ideas with their colleagues in other departments and discovered that some clinicians in the Patient Health Education Center were already aware of the benefits of computer-based health support systems and enthusiastically supported trying to bring CHESS to Simpson. Within a matter of months a small group of "believers" had garnered enough interest to invite the CHESS founder to present information about the CHESS system to a larger group of clinicians. Following this presentation, the initial group formed a Steering Team to work for approval to use the CHESS system at Simpson. The team included a good mix of key players within the organization including well-respected administrators from Oncology, Patient Education, Quality Improvement, Information Technology, and Finance.

Simpson staff familiar with the CHESS Steering Team credited its expertise and persistence with getting the technology approved for use. The team's members each brought uniquely important qualities to the group that helped it succeed. They were each highly respected throughout the organization. They worked well together and provided complementary skills to cover the research design, clinical, technological, and administrative needs of the team. Finally, they had sufficient commitment to the project to stay the course for the 12 months it took to obtain approval.

Their combined expertise helped them shepherd the project through myriad committee approvals. First, they obtained approval from the Patient Health Education Center where CHESS would be housed. Next the research committee had to okay it based on prior research with these types of systems. Then the Patient Care Committee had to insure CHESS would not have any unintended consequences on the overall flow of patient care through the system. Finally, they obtained approval from the main governing body, the Clinical Practice Committee, to spend the money to join the CHESS research consortium and to begin piloting the modules in different departments.

It still took several months after final approval by the Clinical Practice Committee before the Simpson legal department approved participation in the consortium. This was a new way of operating for Simpson involving a level of collaboration outside their organization that they had not embarked upon before.

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### FOCUS ON: *Interplay of Organizational Structure and Ways to Promote and Implement a Project*

The Steering Team at Simpson understood their organization's structure and what needed to be done in order to win approval for their project. This enabled them to succeed where others might have failed. It also helped them garner continued support for the project from various parts of the organization. The extensive approval process also meant the group had thought through many implementation issues before the project started and so were ready to hit the ground running.

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Simpson decided to house CHESS in the Patient Health Education Center. This was a strategically important decision because the Center believed in the system and had the resources to promote it. It also fit well with a new strategic initiative Simpson identified – to insure all patients received appropriate patient education before leaving the hospital. Concomitantly, the Center was charged with reviewing and upgrading all patient education material, making use of new media as a part of this process. Their role at Simpson became more central during this period while attention focused on patient education.

The Center took a two-pronged approach to achieving its objectives. It proactively sought involvement with specialty areas to assess their patient education needs and determine the best way to meet them. One staff member described the response of the respective specialty areas to this initiative as both tentative and enthusiastic. "They didn't quite know how to use our resources in some areas, but the appetite was enormous. There was an identified need, I think, for new patient education materials in every area."

In addition to identifying new needs, they also undertook coordination of a complete review and upgrade of all existing patient education materials for every department. This was a massive undertaking requiring a review of thousands of pieces of written, taped, and computerized material on several quality dimensions. To implement this goal, the staff spent a lot of time obtaining clinician review of the material. When the project was completed, all patient education materials would be centralized in the Center that would then be responsible for regular upgrades. Some physicians were not pleased with this centralization. They felt some loss of control over provision of their own specialty's expertise. However, each specialty had final say over content for their area.

As the Patient Health Education Center embarked on this process, the advantages of using new media to develop future education packages were very apparent. Computerized resources were easier to upgrade than printed material, storage was less problematic, and Internet and intranet access to materials from a workstation anywhere in the hospital would be easy. The Center's interest in using computers as a more integral part of patient education increased as they became enmeshed in an ever-growing pile of pamphlets needing review. They began to envision a new goal – to develop quick and simple computer programs to cover basic aspects of a wide range of diseases.

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FOCUS ON: *Fit with Key Organizational Goals*

In addition to this goal, the Patient Health Education Center also hoped that partnership in the CHESS research consortium would give them the opportunity to work with researchers with widely recognized skills in studying interactive health communication systems for patients. They wanted to increase their knowledge and expertise in the best practices for implementing and researching the systems. They also wanted to develop expertise in creating programs of their own. This included learning more about doing needs assessments and using them to inform development of programs; learning about the best ways to present material; and learning what functions patients liked best. They hoped that collaboration with a wide range of hospitals across the country would give them additional insights into best practices and fresh ideas for development.

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Some Simpson staff had attended a CHESS consortium meeting prior to joining and were particular impressed with “the open minded spirit of creativity and the sense that anything was possible once you open the gateway for people to access this kind of information.”

## 11.3. Implementation of Chess

### *11.3.1. Breast Cancer Module Pilot*

After contract approval, the Steering Team focused on developing a detailed plan for conducting a pilot using the *Living with Breast Cancer* module in the Women’s Cancer Program and Breast Clinic. Women who were newly diagnosed with breast cancer and needed to make a treatment decision would be recruited to use the CHESS module.

The team decided to implement the breast cancer module because it was the most developed of all the CHESS modules; and because the staff had heard the powerful stories of women describing how the system had helped them. The nurse/health educator on the Steering Team had been the de facto champion of the project, coordinating the team’s efforts throughout the initial approval. She continued in this role and became the initial CHESS coordinator. However, the Patient Health Education Center did not carve out protected time for her and she continued to perform all her other duties. She developed the proposal for the breast cancer pilot and went on to gain necessary departmental and Internal Review Board (IRB) approval. Unfortunately, the Center’s request for additional funds to cover the costs of the project was denied. They decided to absorb the costs in their own budget anyway (including costs of purchasing laptops for women without them) in order to get the system off the ground. The Patient Health Education Center was truly extending itself in financial and manpower resources to make the pilot work.

Another nurse champion from the Women's Cancer Program was instrumental in talking with her colleagues in the various cancer groups (Women's Cancer Program, Cancer Education Program, and Breast Cancer Tumor group) about using CHESS as a complement to standard practice. Under their existing protocol, patients received a stack of pamphlets and brochures to take home as part of their education about breast cancer.

A local support group was available for patients, but many women lived in communities distant from Simpson. Staff was concerned these patients had less access to information and support after they left the hospital. CHESS would standardize what the women received, insuring more equitable access to information and support. Because the nurse champion already provided breast cancer education as part of her regular duties, and since the project was part of a research study, the Women's Cancer Program agreed to allocate a percentage of her time to implement the module.

This champion talked with nurses in the Breast Clinic and met with different division groups (surgeons, radiation oncologists) about a study using CHESS. Physician buy-in was a key for insuring ongoing support, and obtaining adequate resources and IRB approval for the associated study. Nursing buy-in was critical as well. It was expected that nurses would generally be the ones making referrals to CHESS because physicians do not view patient education as part of their role.

In a typical visit, physicians would first discuss findings and treatment options with the patient, then nursing staff would provide details about what to expect from surgery or other procedures, recovery, and possible side effects. But the champions felt a physician would be more likely to mention CHESS to patients as an option, and encourage greater enrollment, if it were part of a research study than if it were just another tool of standard care.

Other Steering Team members played a role in organizing the pilot. The coordinator from the Patient Health Education Center assisted in talking with clinicians and presenting CHESS to surgeons and radiation oncologists about using the system with their patients. The Information Technology people were instrumental in recommending computer products to be purchased for loan to women who did not have their own. They facilitated the purchase and the initial configuration and storage of the computers. They were helpful in troubleshooting, particularly when the system was switched to a Web-based platform.

The information technology expert on the Steering Team was often crucial to the group in synthesizing details, focusing on the issues, setting goals, and problem solving. The biostatistician from the Clinical Research Department focused on the research aspect and assisted in promoting acceptance among clinicians.

Fifty women were recruited for a pilot project and given six-month access to the breast cancer module. The CHESS coordinator trained three Patient Health Education Center instructors to assist her with training the patients involved with the breast cancer pilot. The most surprising result was the frequent use of on-line discussion groups and the lesser use of information features included in the module.

### *11.3.2. Ongoing Implementation of the Breast Cancer Module*

Based on the results of the two-year pilot, the Center approved hiring a full time CHESS coordinator. One of the first efforts for the coordinator was to coordinate recruitment efforts for a study being conducted by the developers. Simpson participated as one of the sites. While participation enhanced the research findings around module use, it also slowed dissemination of the module to more patients. Nurses could not offer the module to all interested parties when they were recruiting for a large clinical trial in which patients were randomized to receive different types of support tools besides the CHESS system.

## 11.4. Implementation of Other CHESS Modules

### *11.4.1. HIV Module Initial Pilot*

At the same time the breast cancer module was being piloted, Internal Medicine was looking for innovative ways to provide support to HIV patients. In 1998, HIV patients, once over the initial shock of diagnosis, were beginning to ask, "How can I live with this disease?" A traditional support group would not work for everyone. Confidentiality was an issue, as was the distances some rural patients would have to travel to participate. Computer-based health information and support seemed an innovative opportunity to fill these patients' expressed needs.

The Steering Committee once again stepped in to encourage implementation. One of its members assisted a physician in writing a grant to offer the HIV module to patients. The IRB approved the study and $10,000 from the State Department of Health was awarded to buy laptop computers so HIV patients without access could use the module.

In spite of a strong effort, recruitment of patients was disappointingly small. The HIV Clinic sent a letter to all its patients inviting them to use the new module. Staff described CHESS to patients at their clinic visits, encouraging them to participate and reassuring them of confidentiality when they used it. Internal Medicine staff was surprised by the lack of response. They had thought that patients would be eager to sign up.

Training patients in the use of the module was more of an issue with this population. The confidentiality of the patient's condition needed to be maintained at all times, yet it was important to try to include training in a regularly scheduled clinic visit. Patient Education staff was responsible for providing the initial CHESS training. In hindsight, HIV clinic staff felt this might have been an additional barrier to acceptance by patients who wanted their condition known to as few people as possible. They believed HIV staff members that were already known by the patients probably should have done the initial training. The HIV staff already provided help for patients currently using the module if they asked questions at a clinic visit or when a caseworker visited their home.

The HIV module succeeded in providing information about illness and an opportunity to communicate confidentially with others dealing with the same problems. Because such a small sample used CHESS, however, it was hard to evaluate its impact for patients. Additionally, the discussion group was too small to provide much social support. This was a particular disappointment to the department. The 6-month trial was too short to provide meaningful results. Staff felt they needed more time to promote CHESS, reassure prospective users of confidentiality, and assess what other barriers existed for patients.

Staff in the HIV Clinic wanted to continue using the module after the initial pilot in order to work out some of the bugs in the implementation scheme. The rapid pace of change in HIV, however, necessitated a major module update but money was not available to do this. The developers decided to shelve the module until resources could be found. This concerned the HIV and the Patient Health Education Center staff as well. They began to question the viability of a system where resources for updating were not assured.

### *11.4.2. Engaging New Departments in CHESS Design and Dissemination*

Concurrent with the Breast Cancer and HIV pilots, the Steering Team continued to promote CHESS through contacts with potentially interested clinicians from other specialties. The coordinator presented a poster session to the Quality Conference and to the Simpson Technology Fair on CHESS and all of its modules, including prostate cancer, heart disease, and asthma. This presentation piqued interest from several clinicians regarding further development or modification to existing modules. Steering Team members also made contacts with clinicians from the Alzheimer's Center, the Nicotine Dependence Center, Urology, Pulmonary Disease, Cardiology, and Oncology. They continued to communicate about CHESS implementation efforts to colleagues in leadership positions within the Simpson administration, as well as to the Patient Health Education Center staff and administration.

Team members from Oncology focused on speaking to Cancer Center leaders regarding the positive patient outcomes from breast cancer patients using CHESS. In many of these efforts the Steering Team felt staff was receptive, appreciating the integrity and character of CHESS. People were interested in a product that would be reliable.

The Urology Department participated in a needs assessment to help determine content for a new prostate cancer module. Although they were not actively involved in development of the prostate cancer module, they did review content prior to its use at Simpson Clinic.

One further expansion and collaborative effort to result from these promotion activities was a joint grant-funded project for a teen smoking cessation module. The project was under the direction of researchers in the Tobacco Addiction Department at Simpson and involved developing and testing a new CHESS module to help teen smokers quit smoking. Development of the module involved utilizing the expertise in module development and presentation of the CHESS developers as well as the expertise of the Simpson team in smoking cessation content and methods. The two groups soon found they had much work to do in learning how to meld their respective areas of expertise and experience into a viable means of new product development. Working through these issues, along with difficulties encountered with the recruitment and research design, led to some conflict between the research partners. Nonetheless, the project resulted in the development of the new module.

Clinicians in both Cardiology and Pulmonary Disease expressed some interest in using the CHESS modules for their patients. In both cases they were interested in starting with a research project. No real champion came forward to develop a project and seek funding for it in Pulmonary Disease. A cardiac physician was a co-investigator on a grant submitted with the founder as a principal investigator, but it was not funded. An issue concerning continuity of care was a stumbling block for use of the module by the cardiac care nurses as well – many of their patients left the hospital and returned to distant homes under the care of a non-Simpson physician. They questioned how well the system would work if it were provided by an institution that was not involved with the patient's follow-up care. There needed to be a greater connection between the hospital and the patient's aftercare clinician.

In a few instances, a department contacted by the CHESS coordinator expressed reservations about working with an outside organization to develop patient education material that would not be used exclusively by Simpson. In these instances, the clinicians expressed concern that the project was in competition with the Clinic's own website.

### *11.4.3. Library Project*

The Patient Health Education Center also piloted a project to offer four modules in their library where patients and their families often came to find information about their disease. The four modules offered were breast cancer, prostate cancer, heart disease, and asthma. Results showed that 61 percent of patients introduced to the CHESS modules chose to use them, and of these, 87 percent chose to continue use at home. Impact on staff time to introduce patients to the system was minimal and a satisfaction survey sent to patients indicated they believed they benefited from use of the modules. Concurrent development of a patient Web portal bodes well for the permanent offering of IHCS for patients and families at Simpson.

## 11.5. Analysis of the CHESS Implementations

The following factors in the model described in Chapter 5, Implementation Model Development and Testing, played the biggest roles in the outcome of the CHESS implementation at Simpson.

### *11.5.1. Organizational Environment*

The environment for the implementation of CHESS at Simpson Hospital was quite positive; it did not present any major barriers. Staff was generally positive about the environment and the opportunity for innovation at Simpson, particularly those in the higher-level provider category. One young physician expressed his belief that the clinic was good at conveying its mission and vision to new physicians and at providing good mentors who helped newer staff align their own innovative ideas with that mission. "Turf wars" were not really an issue when new ideas were considered since physicians are salaried. Lack of staff time to work on new initiatives, however, was considered a significant deterrent to new ideas being implemented. This proved to be a bigger problem at later stages of the CHESS implementation as the Steering Team tried to spread the technology to new departments.

In addition, the way health care was delivered outside of the hospital setting was a hindrance to spread the technology, at least for the heart disease module. The lack of integration of care between the hospital and aftercare providers made it harder to find an appropriate way to implement CHESS modules.

### *11.5.2. Organizational Motivation*

Each year, top management sets overall goals for Simpson Hospital, and each department then develops annual goals aligned with the larger goals. Once goals and plans are set for the year, it is very difficult to get things done outside of that plan. When Simpson set enhancement of patient education as an actionable goal, it increased the importance of the Patient Health Education Center within the organizational hierarchy and created an opportunity to find new and creative ways to deliver health education.

Clearly CHESS could help the Center achieve some of its goals to upgrade patient education materials and incorporate innovative education techniques and new media into their library of tools and materials. But while some staff at Simpson saw CHESS as a way to expand their library, others had a vision of moving beyond CHESS to develop their own tools. For this group, CHESS was a transitory step to gain solid experience with new technology and a way to get their feet wet developing their own content. They saw use of CHESS as an early step in a phased development of a large expansion of the existing Simpson website. One provider chaired a committee to develop potential content and management of a Simpson website. He described the work of his committee and development of the website as a process that would occur in phases: "We created a document that gave decision specifications and implementation strategy for phase one. We said it's a phased approach. Last week I presented it to the Foundation, the whole committee and got tentative approval". He envisioned the development of the Simpson website as something fluid that would take the lessons learned from many different Web experiences to evolve a uniquely Simpson product in the end.

> If we kept designing and designing and designing, you're basically a spec-driven organization as opposed to a prototype-driven organization. The analogy I use is that there's two ways to get across the ocean. One is in a raft, and you put the best people on and you stay fluid and adaptable and you get across and then you learn how you got across and you go from there. Or you sit back and ponder and ponder and ponder, build a Titanic and get hit by an iceberg and you never make it across. So the faster way would be to take a small group, these 12 [committee] people, come up with a good enough design, plug it into the bigger system, and trust and risk. You scale down [your plans]; work on a little prototype, maybe a patient education CHESS module or something like that. And then you make sure you know how that little activity connects to your bigger activity.

Staff members familiar with CHESS were pleased to have the chance to partner with a group that had a solid product grounded in research and who would help them to learn more of the ins and outs of how to develop Web products themselves. One staff person who was involved with the Patient Health Education Center when they were considering adoption explained her view of the partnership as temporary:

> I thought CHESS was a decade ahead of its time. I didn't think that Simpson, for example, might always be linked to CHESS. Eventually we would have the capability technologically without CHESS specifically. I just didn't see CHESS as a forever solution.

What particularly attracted this same person to the partnership was the added value for client social support and decision-making, specifically, having live moderators for the disease-specific discussion groups. Also cited was the opportunity for users to do some self-evaluation and get help making decisions and the chance to share information about use, benefits, and best practices across a consortium of high-end hospitals all using the same technology.

She also shared concerns about whether chronic care users would derive the same benefit, and how it would be implemented for them. For patients leaving Simpson for aftercare elsewhere: How would they get access to information? Do they have information needs spread over a long period? If so, how is the time of greatest need determined? What are the cost implications of loaning computers to those without one, when and for how long? How should efforts to coordinate with an unknown follow-up care provider be handled?

### 11.5.2.1. Technology's Ability to Solve a Key Problem

A theme repeated by several providers was the need to simplify and clarify Internet health information in some way. Use of CHESS, with a solid quality reputation, was one way to do this. As one provider expressed, " The management of information is getting chaotic. If I go to the Internet now, or if I even try to keep up with my paper literature, there's just so much that so many people are throwing at me. I need to simplify. That's my rationale for championing this."

Related to this was the notion of the role of health care providers in teaching/assisting patients to use technology appropriately to manage their health care. One provider talked of his current experience searching the Web and his sense of responsibility to his patients who would have similar experiences:

> If I search the web [for asthma], there's over 2,000 sites. Where do I go to get contextually appropriate material that I would say is a recognized brand or recognized quality? I have no easy way to guide me or my patients or my children. Where do they find that sort of information? I trust they'll find their way [but] I also think that's our responsibility [to direct them].

### *11.5.3. Technology Usefulness*

One Steering Team member, who was primarily a data person, described how a real key to his enthusiasm for bringing the system to Simpson was hearing a group of current breast cancer patients talk about their experiences using the system. He was aware of the data, but the stories gave it life: "We'd heard the stories, seen the articles. [But] when you hear the women speak about it, it's like, oh my gosh, this is really powerful stuff." Another spoke of how she had been committed to the idea ever since she first heard these stories: "I'll almost never forget that first exposure that I had, thinking about women accessing this breast module between 11 p.m. and seven in the morning. I was so excited about what this represented that there was never a question in my mind of not implementing it."

Use of the CHESS modules also gave Simpson staff valuable knowledge of the problems and pitfalls in providing computer access to a diverse population, including issues of poor or expensive Internet connections, training for novice users, and other computer issues. They developed expertise about what segments of their patient population could and would be able to use these types of systems, and what would be the cost to Simpson in backup and support for users.

An additional plus for the Patient Health Education Center was the opportunity to offer patients an alternative means of delivering patient education. As one staff member explained: "Patients weren't showing up for patient ed sessions [which] created frustration in holding a class. But many patients were driving in 50 or 60 miles for appointments. They couldn't stay around for a class or support group."

One concern of the Patient Health Education Center, where CHESS was housed, was the lack of modules to cover a wider variety of disease states. Although the modules addressed in depth some of the major areas of clinical concern, they lacked the ability to cover a very wide spectrum of diseases on a more superficial level. "It addresses such a small percentage of our patient education needs that it's distressing. That calls into question how much commitment one can make to a system that's not bigger."

This represented a major difference in strategic approach between Simpson and the CHESS developers. The greater depth of the modules also meant they took longer to develop. Simpson needed to develop materials for many different areas very quickly. The developers were interested in covering a few of the largest, most common diseases in great depth, providing a wide variety of social and emotional support, assessment, and decision aid tools around issues common to the disease. The Center, however, had a more global orientation in keeping with its customer base – wanting to provide basic information to cover a broader range of diseases. As one clinician put it: “There’s a lot your organization (the developers) can still teach us, but is it practical? Is it implementable? Or is it too specialized to be generalized and supported fast enough for the broader model?”

### *11.5.4. Promotion*

The Steering Team and, subsequently, the CHESS coordinator who was hired later worked hard to promote the system throughout the organization. Having a group of people with diverse backgrounds and different sets of contacts throughout the organization helped significantly to promote awareness and develop support for the system. A strong physician champion, however, might have given them more opportunities to influence clinicians.

While a few clinicians were uncomfortable supporting a technology they saw as competition for the developing Simpson website, most saw no conflict and were at least somewhat supportive.

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LESSONS LEARNED: *Implementation Role Training for Staff*

Perhaps the biggest barrier to implementation was the sheer size and complexity of the Simpson organization. For example, the CHESS coordinator described the complex process of getting a module approved and familiarizing the clinicians with it so it would be used. First, she had to demonstrate the module at a clinical division meeting and, if they liked it, get clinician volunteers to review the content. Then she had to set up meetings with this group of volunteers to facilitate their review and give feedback to the developers about needed changes. Even after review and final approval of content, she still needed to familiarize all division medical personnel with the system. In the case of heart disease, for example, that meant 110 physicians, plus clinical nurse specialists and nurse practitioners. It was a complex process to get into the practice and figure out how best to demonstrate to this large group.

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One clinician in asthma, who was enthusiastic about the system, also described the need for protected time if a champion was to really work to promote it:

> For our asthma program, if there’s enough understanding of what CHESS is about, and how it would enhance our patient care, then somewhere along the way people have to be given time and resources to set up a project. The barrier to taking an innovation and creating an internal priority for it also depends on competing priorities and the local practice bias. So, a lot of people may still be uncomfortable with new technology. So there’s that fear and how much will it impede my current delivery system.

Since Simpson is a physician-dominated institution a successful project also needs to secure key physician approval. One staff member familiar with the project felt the lack of a strong physician champion was a barrier to expanding CHESS to other areas: "I think we could have moved faster here and been more widespread with a credible, well-known, and well-connected physician leader to spread [the technology]. In our culture, that's what it really takes to get it going."

Thus, in spite of the relative ease the experienced and well-connected Steering Team had in getting approval to bring CHESS to Simpson, it was harder, in this person's assessment, to spread it without an influential physician providing very visible support.

A strong physician champion in an influential leadership role might well have been one way of developing sufficient physician enthusiasm to overcome the "inertia of overwork" and to spread the system.

## 11.5.5. Implementation Process

### 11.5.5.1. Processes to Identify, Refer, and Support Users

Once a particular department had decided to adopt a CHESS module, the process of referral often collided with organizational culture. The Patient Health Education Center worked with individual departments to assess how things were going and to evaluate why referrals were not always made. One senior member of the staff characterized the biggest barrier to patient referral as stemming from difficulty in changing the way things have always been done, and about learning a new technology:

> I don't think very often there was a sense of this isn't a good thing, go away and don't bother me. It was more a sense of for 12 years I've been taking care of breast cancer patients and here's how we educate them and it's easy and it's routine. I make a checkmark on this board when it happens. And now we have to get somebody else to come up and talk to them about a different way of doing that. I think its just inertia. It's hard to get people to change behavior. Also, we had virtually no computer based patient education going on at the time this came in, so it was new technology for these educators to deal with and process.

The newness of the technology also put an added burden on the Patient Health Education Center to train the educators in the various departments on how to use the system and how to train patients to use it as well. But there was a clear sense that this was part of their mission: "At our institution the central patient education process is to train the educators, not to do the education. We need to be the catalyst and make good things happen out in the practice where the local experts are."

The experience of one breast cancer nurse is instructive. She related what happened when she brought a laptop to demonstrate the system to a meeting of breast cancer physicians. "They looked at it and played with it and said

"Oh that's really neat" and approved its use. But two months later they hardly remembered they had looked at it."

So it was easy to get approval for use once the content had been approved, but more difficult to get physicians to remember the tool or recommend it to patients.

Recruiting patients as part of a research study had an impact on the ease of referral. The CHESS module could not be offered to anyone who was interested when patients needed to be randomized to other types of support tools in addition to CHESS.

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LESSONS LEARNED: *Home Department*

Housing CHESS in the Patient Health Education Center was a key to its success. The Center offered extensive support of CHESS, and the Steering Team coordinator, who was the strongest champion, was a department member. CHESS allowed the department to demonstrate its abilities to come up with new and creative ways to provide health education and support. Furthermore, CHESS fit with the department mission whose resources were adequate to support the CHESS implementation. The Center gave individual department champions a constant and nurturing environment from which innovations like CHESS could expand and grow within the larger organization.

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### *11.5.6. Key Personnel Awareness and Support*

An integral part of implementing CHESS at Simpson was developing awareness among key personnel about the system. One key medical director said he had learned more about the meaning of patient education and how that fit into the medical experience at Simpson as opposed to simply providing information.

The effect of new tools, even for a very progressive organization, still raised some threat to some providers who felt the Internet usurped their competitive advantage of providing "better" health education information to patients than some other provider. The fact CHESS was not a "Simpson" brand name raised this issue in particular. Some providers expressed concern about sharing their expertise to review and comment on a system, or to use a system that would have no marketing advantage specific to Simpson, which other health care organizations could use as well. In spite of this, the staff in the Patient Health Education Center was successful in getting physicians to review and comment on the modules they made available to patients in the library.

Some staff talked about the strong medical model culture that still made it difficult for clinicians to fully embrace systems that made patients more of a partner in their care. But this did not appear to be an issue for the younger clinicians interviewed. More at issue was just how they might make use of this system in their practice. The idea of making it available in the central library was a very appealing way to implement.

The ongoing push to develop more material for the Simpson website also meant that the institution was increasingly using the Web to supply information to its patients. But the extent of this Web involvement was unclear in 2000.

### 11.5.6.1. Clinicians See Their Patients Are Benefiting

Clinicians in the Patient Health Education Center where the library implementation occurred were pleased to learn that patients of all ages, including seniors, were able to learn the system and technological barriers, such as learning to use a mouse, were not overly intimidating. They wondered, however, if their experience might not have included some self-selection, with those who were more intimidated simply not trying it out at all.

Breast cancer clinicians were also pleased with outcomes from their study, though surprised that it was the social support more than the informational pieces of the module that received the most use.

## Conclusion

It appears likely from all indications at this organization that Simpson was well entrenched in the concept of providing an interactive health communication system as one mechanism to help inform and provide support for their patients. Between their own website and the CHESS modules they have shown no indication of stepping away from this technology. What remains to be seen is whether the technology is one that clinicians will begin to embrace fully – regularly suggesting their patients use it – or one they only occasionally remember to recommend. Because of Simpson's status and ability to recruit high-quality young physicians, it seems likely this will change over time as younger clinicians, more familiar with technology, begin to accept it as a regular tool for patient care and recommend it to patients who themselves are more technologically savvy.

# 12
# Caregiver Resource Center Network, 1999–2002

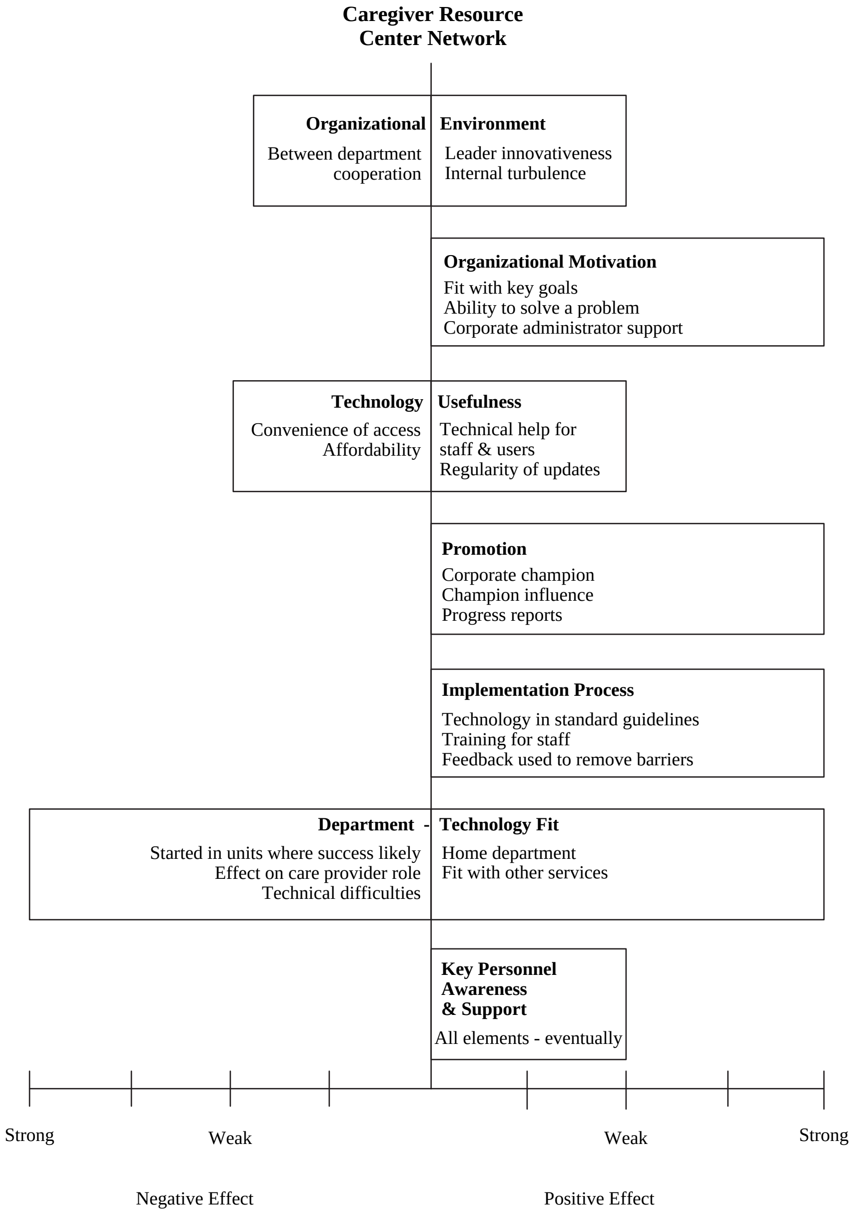
Leah Eskenazi, Pauley R. Johnson, Tracy Siegler, Gail Casper, and John Fellows

The Caregiver Resource Center Network's implementation of a CHESS-like system (DementiaCare) demonstrates the value of an interactive health communication system (IHCS) in non-medical settings. No physician referral was required or even involved as part of this implementation. One site served as the "CHESS coordinator" and staff at the other resource centers received training and support for using CHESS with their population of caregivers of dementia patients. The staff could offer the program to all interested caregivers in their particular region of service.

## 12.1. Description of Environment at the Site

Based on national data, an estimated three million family and informal caregivers from one state provide 3,412 million unpaid hours of care to adults who suffer chronic brain disorders such as Alzheimer's disease, stroke, Parkinson's disease, traumatic brain injury, Huntington's disease, and other similar conditions, at a market value of over $30,056 million. A law passed by the state in 1984 established a network of 11 non-profit Caregiver Resource Centers to help families keep their impaired loved ones at home. One of the organizations, Caregiving Alliance, was the model for the 11-center system. In addition to operating a Resource Center, Caregiving Alliance also serves as the statewide resource consultant to the state Department of Mental Health, which administers the Resource Center Network.

Located in a heavily "wired" city, the Caregiving Alliance witnessed the explosion of consumer-focused Internet technology firsthand. Caregiving Alliance believed an opportunity existed to harness this technology to improve service capacity and delivery for family caregivers. DementiaCare, an online family caregiver support program, was believed to be the first program in the country to use the Internet to provide online information, services, and connections to caregiving families on demand. This case study examines the implementation of this IHCS in a network of non-profit social service organizations that are



relatively small, non-hierarchical, and funded by both public and private sources. As such, this setting is much different from the implementations emanating from hospitals and multi-specialty clinics found in the rest of this book.

During the fiscal year 2001–2002, 14,475 family caregivers utilized one or more core services offered through one of 11 Resource Centers. Services help families keep their relatives/patients at home by educating them about brain disorders, assisting with problem-solving and coping strategies, and (via respite care) giving them a break from 24-hour care demands. Each Resource Center provides caregiver specialized advice, information and referral, uniform caregiver needs assessment, family consultation and care planning, support groups, education, psycho-educational groups, vouchers for consumer direct purchase of respite services (in-home, adult daycare, facility care), legal and financial planning consultation, and counseling. Respite camps, caregiver retreats, and other caregiver support options are also provided. The Resource Center strategy is to assist and empower caregivers, while also leaving responsibility and decision-making in their hands. The strategy essentially allows the caregiver to be his or her own case manager.

To insure statewide coverage of caregiver services, the Department of Mental Health contracts with a not-for-profit organization to serve the adult caregiver population living within one or more of the state's counties. Resource Centers operate independently within different structures.

Approximately 190 human service and administrative personnel staff the Resource Center system. Family consultants, primarily social workers with a background in aging or rehabilitation, have primary client contact. The statewide Resource Center system consists of the 11 non-profit Centers, their respective boards of directors, and advisory committees. Caregiving Alliance serves both as a resource center and as a consultant to the ten other resource centers, all dedicated to the assistance and support of caregivers and their families. The Resource Centers provide similar core services throughout the state. An operations manual provides the policies and procedures for consistent core Resource Center operations statewide.

Demographic trends projected a substantial growth in the number of chronically ill adults requiring assistance from family caregivers. United States census data estimated that 16–22 percent of the state's families were caring for a brain-impaired adult. Adult-onset brain impairment exacts an enormous toll on the affected individuals, their families, and caregivers. Family caregivers share common problems, regardless of the particular brain impairment affecting their loved ones. These include lack of basic information about brain impairments and where to turn for help in the community, concerns about legal and financial issues, and elevated stress symptoms. It has also been determined that caregivers have lower immune functions, increased susceptibility to health problems, higher rates of depression, and are twice as likely to use psychotropic drugs. Up to 80 percent of the patients' long-term care is provided by family and friends in the home.

Although formal community services to educate and support caregivers have become more widely available in the last decade, under-utilization of the services and reluctance on the part of caregivers to initiate use of these services persist. Despite substantial research efforts to understand and address these issues, low rates of community service use by this population continues, often imperiling the caregiver's physical and emotional health. In addition, a common concern by professionals is that caregivers may find the services inaccessible and/or difficult to use. For instance, leaving their homes, garnering the energy to attend support groups, or consulting with professionals after work is difficult for many. Juggling work and tending to family demands leaves little or no time for other priorities. Some lack transportation or care relief options. For families living in rural areas, the lengthy distance to service facilities often compounds already difficult transportation needs, adding to the caregiver's sense of isolation.

Caregivers often exhaust all other resources, usually family members and close friends, before seeking "outside" or non-family help. When they do reach out they often find that service hours or service availability do not meet their needs, and that information sources are fragmented. A system like CHESS may be well suited to meet the needs of this population.

## 12.2. Timing of the Implementation in the History of CHESS

Caregiving Alliance's implementation experience was different than the others in this book in that the organization was not a member of the CHESS research consortium, and the system they implemented was not a CHESS module. At the time that Caregiving Alliance began collaboration with the CHESS team, the CHESS research consortium had just finished a period of growth in membership and was in a stable phase with six members. CHESS was completely Internet-based and was no longer considered as innovative as it once was since other similar programs were beginning to be developed. The CHESS design was established and respected and this was the design on which DementiaCare was based. The new program was an innovative undertaking, however, since this type of program had never before been used to support caregivers in conjunction with a community-based network. This use and setting brings to light new implementation issues that may not have been as obvious in other health care settings but that can certainly provide insight into ideas and strategies that could be useful in many implementation situations.

## 12.3. The Decision to Create DementiaCare

In the mid-1990s, Caregiving Alliance leaders discussed the growth in computer technology and predictions about the Internet. They considered the potential impact the Internet would have on Caregiving Alliance and the long-term care system. The ensuing years saw exponential growth in the development of computer technology and the Internet, fueled by growing interest from the for-profit sector. Adoption of technology in the not-for-profit sector followed at a decidedly slower pace. By 1998 the demographics of Internet users were shifting to reflect the general population. Early technology adopters in health care and academic environments were working to reshape their organizations to embrace electronic data management and service systems. Charitable foundations were just beginning to recognize and consider funding computer-related projects including online service delivery.

This trend gave rise to a growing interest in consumer health informatics. The Caregiving Alliance executive director attended conferences and information sessions including those offered by the National Library of Medicine and National Telecommunications and Information Administration showcasing the leading experts of the day on consumer health informatics. She consulted with a wide variety of professionals and lay people, seeking ideas on how to use technology to expand the reach of Caregiving Alliance services.

The present and the former executive directors of the Caregiving Alliance conceived an online support and information resource for caregivers. Given the popularity of the existing Caregiving Alliance website and online open caregiver support services, and considering both the projected growth in the number of family caregivers as well as the proliferation of online consumer and business applications, they saw DementiaCare as a natural next step.

Resource Center directors, for the most part, perceived computer technology as a useful tool to manage administrative, communication, and data collection tasks, as well as to reduce the cost of mailing outreach and event materials. Directors also voiced an awareness of the potential of DementiaCare to reach out to the growing population of computer-literate, working caregivers of families with adult children with little free time. They mentioned that DementiaCare was a visible tool to help distinguish the Resource Centers as innovative leaders in the delivery of caregiver support. Direct service personnel were decidedly less concerned about program image. Their interest was in developing a system that would help them in their daily work and would deliver maximum benefit to their clients.

After months of research into the field, the executive director initiated a conversation with the founder of CHESS. The CHESS team was highly regarded for its work in consumer health informatics, including the development of computer-based modules addressing specific health self-management concerns. The *Living with Breast Cancer*, *Living with HIV/AIDS and Caregivers of Persons with Memory Disorders*, *Alzheimer's and Other Dementia* modules were being tested as part of a broader research initiative in patient care settings. The Caregiving Alliance executive director proposed raising the funds to allow Caregiving Alliance to work with CHESS to build a module addressing the needs of family caregivers. The objectives for the module included providing direct care interventions to increase caregiver well-being and coping skills, and the development and implementation of the first Internet-based caregiver support system to complement an existing community-based system. The Caregiving Alliance did not join the CHESS research consortium of more traditional health care organizations since their primary interest was to tailor a CHESS module specifically for their population of caregivers.

## 12.4. The Development of DementiaCare

The agreement between Caregiving Alliance and CHESS was to jointly create "a gateway to information, support, decision-making and linkage to community resources on the Internet on a regional basis." Family caregivers were to have access to decision-support programs (developed for CHESS modules), an information library, moderated support groups, ongoing consultation with family consultants, the Resource Center's complete database of community resources, and other specialized services. Online services were to complement services delivered by the Resource Center, and were meant to provide an enriched information and support environment for caregivers, at the caregiver's convenience.

The concept was for caregivers to enter a secure website using a personal password after becoming a client of a Caregiver Resource Center. For those caregivers without access to a computer or the Internet, efforts would be made to loan equipment and to secure reduced-cost Internet access and training. Five Resource Centers volunteered to participate in the project. A minimum of 40 caregivers were to be enrolled from each site for a total of 200 participants.

The CHESS developers took the lead in customizing the site design by modifying and integrating a number of specialized interactive services such as journaling and decision aids. Caregiving Alliance coordinated the review of all site content coming from the CHESS Alzheimer's module. They updated and drafted new material, and provided fact sheet content that had been previously developed. CHESS housed the site on its server and managed the majority of content entry and site maintenance functions.

Caregiving Alliance built protocols for integrating the module into the existing service delivery function and recruited pro bono medical, health, legal, and financial professionals for the "Ask an Expert" service. Caregiver experts were recruited from within the Resource Center system. The Caregiving Alliance executive director visited each participating Resource Center to describe DementiaCare and to go over the data gathering requirements. Concurrently, Caregiving Alliance was working to complete a separate but related project – the newly redesigned electronic Community Resource Database, which CHESS would integrate into the module.

### FOCUS ON: Organizational Motivation: *Fitting Technology into a Human Services Organization*

The Resource Center system strategic plan included the goal to "promote research and technology projects that lead to program and policy innovation for caregivers and adults with brain impairment." The plan, drafted prior to the statewide availability of DementiaCare, did not include mention of DementiaCare or its focus on direct support of caregivers. It is probably fair to say that the Resource Center directors, while recognizing the need to use information technology, had not yet conceived of an online service delivery modality. Early on, the Resource Centers did not fully recognize or address the critical and substantial organizational changes that Internet technology would require. By the 1990s, while some sectors of the economy had enthusiastically embraced the dramatic growth in information technology, others such as the health care and human service environments had been reluctant, slow, or late adopters. Early adopters within these sectors who promoted and initiated information technology-related business practices faced an uphill battle. Traditional person-oriented communication habits and attitudes, and behaviors of leaders and practitioners, seemed at odds with the more austere mechanics of electronic information delivery. Experience with earlier computer systems compounded this perception due to weak system designs and immature user interfaces, lack of training and expertise among the workforce, and the constant turnover of staff. Caregiving Alliance, in partnership with CHESS, was embarking on a path to diffuse a technological innovation that would directly impact organizational culture and create social change.

## 12.5. Initial Implementation of DementiaCare

With two years of funding in hand, DementiaCare was initiated. The Caregiving Alliance director set up the initial implementation as a research study to test the usability of the site and evaluate implementation processes. The information learned would be used not only to improve activities related to DementiaCare, but also to inform others through presentations and papers working in this field about the use of an IHCS. The five Resource Centers that were written into the grant confirmed their commitment to help test the start-up and delivery of the online caregiver support system. The ambitious and complex nature of the project was felt early on. They were working together for the first time to initiate a new service using the relatively new medium of the Internet. Users were to be recruited from five geographically and culturally distinct Resource Center human service organizations that were staffed by a significant number of reluctant technology adopters. On the positive side, both parties were experienced in grant administration and both were committed to testing the potential of the DementiaCare program.

Outreach and marketing materials were developed that included information mailers for the Resource Centers, newsletter articles, Power Point presentations, and so on. A press release was picked up by national media including Reuters Health Online, DrKoop.com, and AOL newswire, as well as by the local media. Information from the executive summary was included in articles and foundation reports on technology trends and caregiving. DementiaCare was presented at conferences from coast to coast. Efforts were intended to get the word out to long-term care, human services, and other such audiences that it was possible to use this type of system in a community-based organization – an innovative idea at the time.

To other professional and research-oriented audiences, efforts focused on reporting how the innovative project was working. During this wave of technology as the “new, new thing”, professionals soundly embraced the potential of DementiaCare, yet those involved in its day-to-day operations revealed many hurdles yet to conquer.

By the end of the year, all of the participating Resource Center site staff had received an intensive orientation to the website and research protocol. Memoranda of agreement that detailed responsibilities of each party were signed. Periodic conference calls with the Resource Center directors, as well as presentations by Caregiving Alliance and CHESS staff, promoted continuous learning and provided opportunities for feedback.

Three Caregiving Alliance staff – the executive director, her executive assistant, and a website coordinator – had been sharing responsibilities on a part-time basis for most of the management of the program. A fourth staff person assumed responsibility for facilitating “Ask an Expert” inquiries on an as needed basis. In addition, in the fall of 2000, a project manager was hired to revamp the user content, promote user retention, and work with the Resource Centers on staff referral and caregiver recruitment strategies.

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### FOCUS ON: Customizability

The first six months of the grant period revealed that Caregiving Alliance and CHESS held different expectations for the website’s operations. CHESS offered an established and respected module design that had been built for Microsoft’s Internet Explorer, and had been used successfully with seven other modules. The CHESS design offered intervention tools and reliable comparisons with other CHESS disease modules that aided research goals. Caregiving Alliance, on the other hand, sought a program that could be more easily customized to suit its needs. They wanted to provide operability across platforms – that is, Macs, PCs, and a variety of browsers. They also wanted user-friendly operating features for optimized graphics and navigation, as well as the capacity to capture data for analysis. This need for customizability would eventually lead to major changes in DementiaCare, abandoning CHESS and developing their own program.

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Although DementiaCare was not implemented as a research project, the Resource Center still needed a systematic way to identify and recruit users. The site was launched in March of the project’s second year. The initial enrollment procedure, requiring clients to complete and mail in a form, was quickly replaced with a phone enrollment process after fewer than half of the initial 120 identified enrollees returned the forms. Online registration was discussed but not immediately initiated. To use DementiaCare, family caregivers completed an intake process, usually by phone, and were screened to determine need. Caregivers then received an in-home assessment that culminated with the development of a care plan that included DementiaCare. A re-assessment was to occur six months later. Once enrolled in DementiaCare, the caregiver accessed the website with a personal password and user name. A user manual and resource list of helpful websites were sent to each new enrollee.

Concurrently, Caregiving Alliance and some of the participating Resource Centers worked on plans to help caregivers secure Internet access so that they could use DementiaCare. Computers or Internet appliances were secured and distributed, and technical assistance was provided. Donated or reimbursable Internet service was made available. Caregiving Alliance believed that solving the access issue would be critical to reducing barriers to use by African-American, Hispanic, low income, and rural caregivers. A substantial effort was given to this worthy endeavor. Without financial assistance and training, some caregivers, particularly in rural areas, would not have been able to access DementiaCare. Because donated computers were used and came without user manuals, and most of the people receiving them were unfamiliar with their use, hands-on installation and training was a necessity. The funding and the time required to provide technical assistance to new computer users out-paced Resource Center capacity. In rural areas, making an on-site visit to deliver a computer or to provide technical assistance could take up the better part of a day. Attempts to recruit technical assistance volunteers were unsuccessful and skilled professionals were too expensive. Fund-raising efforts to support the hiring of knowledgeable technical support personnel for in-home consultation were less than successful due to high cost per client.

From March through October 2000, 106 caregivers were recruited to use DementiaCare. An analysis showed that of these, 14 appeared to have technical difficulties with browser and Internet service providers, which precluded their use. Another 39 never logged onto the system. The 53 caregivers who used the system after they were registered logged on an average of 1.3 times per week during their first month of use and continued to use the system about once a week for the first 3 months. Two of the Resource Centers nearly reached their target recruitment of 40 caregivers, while one Resource Center recruited 15, and the other two lagged behind with fewer than 10 enrollees each. Technical difficulties and enrollment process challenges only seemed to explain part of the disappointing enrollment levels.

In the winter of 2000, 22 family consultants and intake staff were surveyed and interviewed to determine the cause of the lower than expected enrollment. The surveys and interviews revealed significant potential barriers preventing caregivers from even learning about the DementiaCare in the first place. Although the majority of staff believed that DementiaCare offered significant potential for reaching isolated working and adult children caregivers, they also reported a reluctance to refer caregivers to DementiaCare. Technology problems, a cumbersome registration process, and outdated information on the website contributed to the reluctance. Staff noted that technology interfaces were not user-friendly, and that online privacy and security issues were a concern. Concern that the system would result in a loss of jobs was noted, as was the fear that they would be inundated with e-mail.

### FOCUS ON: Fit in Department: *Effect on Staff Workload and Care Provider Role*

Caregiving Alliance worked hard to investigate the reasons why DementiaCare did not seem to integrate as well as was hoped into the way Resource Centers provided service. Staff comments culled from satisfaction surveys and on-site trainings helped shed light on their feelings toward systems like DementiaCare:

"Can't teach an old dog new tricks."
"We do just fine without it."
"Our clients are too old for computers."
"It will take time away from my other work."
"E-mail is my only use for a computer."
"Using a machine to provide services? No way!"
"Maybe in 2 or 3 years from now…."
"It costs too much."
"Let's get back to reality."
"It's not my thing."
"You are only doing this to make the agency look better."

The DementiaCare Project Manager noted that "it is important to recognize these types of comments as symptoms. Getting to the root of barriers resulting in misperceptions and low utilization of technology requires supportive inquiry and persistence."

Varied levels of training and Resource Center leadership support were evident in the survey responses. A significant number of staff new to the Resource Center system were unfamiliar with DementiaCare and had not received guidance on how to integrate the system into their practices. Internet access and inadequate equipment were common problems in the smaller non-profit organizations. Some Resource Centers lacked individual e-mail addresses for staff, while other satellite offices had no Internet access at all. Most offices had a cobbled collection of hardware and software.

Caregiving Alliance saw in the initial implementation of DementiaCare that it is easy to underestimate the power of existing organizational and professional culture to resist change, even when it seems like a "good" change. The survey and interview results prompted an effort to better understand online service delivery and its impact on organizational culture. Staff and program delivery experts were consulted on how to build staff acceptance and improve referral practices.

## 12.6. Redesign and Re-implementation of DementiaCare

The survey and anecdotal user feedback formed the basis for significant website and program changes. A one-time grant from the state's mental health department provided Caregiving Alliance with funding to redesign and add scalability to the system which would give Caregiving Alliance the customizability and flexibility to more easily and cost effectively maintain DementiaCare by developing their own system. Operations were suspended with CHESS.

To defray expensive annual software licensing fees and improve site maintenance flexibility, DementiaCare was redesigned to operate on an open source platform that would allow anyone to copy the source code for a software program and modify it as needed. New graphics and customer-friendly features were added. They included online registration, a personalized welcome message, an events calendar sorted by zip code, and staff-friendly administration functions.

The electronic discussion group was moved from a bulletin board to a more interactive listserv format accessible directly from the user's personal e-mail box. Potential future caregivers unfamiliar with current caregiver services (neighbors, staff, family members, and professionals not working in human services or health care) were queried about their expectations for an online service. A cadre of caregivers and staff were invited to test the revised DementiaCare system in order to solicit user feedback and encourage a sense of ownership. Their feedback was incorporated into the new design.

By late summer, the newly rebuilt site was ready to be introduced to the Resource Centers at a statewide meeting. Now, with full responsibility for DementiaCare operations, Caregiving Alliance hoped to roll out the program in all 11 Resource Centers statewide pending availability of local funding. For this reason, key staff members of Centers who had not used the program before were invited to this meeting to help them prepare for program implementation. In most cases, the directors and at least two key staff attended. They met in a daylong session with the Caregiving Alliance executive director and the DementiaCare project manager. The website was previewed, barriers to implementation were discussed, and each Resource Center left with a plan of action to help guide local program preparation for incorporating the service.

DementiaCare came to a challenging decision point. Caregiving Alliance and the participating Resource Centers continued to await the decision on a foundation proposal to fund the expansion of DementiaCare to Resource Centers statewide, and the addition of new support features on the website. The state faced an economic downturn fueled by the "dot-com" demise. Resource Centers were preoccupied with attempts to position their organizations and prepare strategic funding applications to secure a portion of the National Caregiver Support Program funds being funneled through each county they served.

Armed only with the belief that the Internet was a growing part of caregiver service delivery and that the customized DementiaCare was the best tool available for the Resource Centers to work with, Caregiving Alliance decided to move ahead to expand DementiaCare statewide without assurance of any additional funding. Ten Resource Centers (five new to DementiaCare and five continuing) chose to adopt the program. One opted not to participate, citing local financial concerns. In a vote of confidence, each participating Center agreed to make a financial contribution of $5,000 to support ongoing program operations. Two

Resource Centers made an additional contribution with funds received through the National Caregiver Support program.

In their efforts so far to implement DementiaCare, Caregiving Alliance realized they had “underestimated the culture shift necessary to incorporate computer technology into a helping profession work environment.” They also learned that technical lingo, including words like “browser,” “ISP,” “platform,” and “IP address,” was like hearing a foreign language. Staff was “reluctant to voice their ignorance and/or concerns about the technology since it was a person in a leadership role conducting the site visit (training).” Drawing on what had been learned, the DementiaCare project manager designed a training curriculum to prepare the Resource Centers for implementing the revised program in order to build commitment to the full use and integration of the DementiaCare program into each Center’s practice.

### FOCUS ON: Fit in Department: *Fit with Other Services/Procedures*

To understand the concerns about a technology like DementiaCare, it is important to know something about the culture of human services professionals. Clients typically come to a human service professional for help and advice. The professional works to give clients the help needed by determining what would be best for them at that time. While it is true that the Resource Center network’s core premise, even before the implementation of DementiaCare, was to first listen to caregivers and then to present them with a range of options and resources, DementiaCare presented a further deviation from the culture of the Resource Center staff. Now instead of working with caregivers face to face or over the phone, options and resources would be presented to the caregiver through DementiaCare. Caregivers would be able to use one another for support and information and communicate with Resource Center staff over the Internet.

On-site training sessions were conducted at Resource Centers that were just beginning to use DementiaCare, as well as at the original five Resource Center sites. The training was customized based on site culture, service delivery area (e.g., rural, urban, multicultural), and other information provided by the Resource Center directors. The curriculum was designed to make it easy for staff to bring their feelings about DementiaCare into the open. It incorporated exercises and information to address staff fears and concerns about, among other things, their lack of knowledge about computer communications in general and DementiaCare in particular. After addressing these issues, staff was guided through the program, and enrollment targets were discussed. Access information was provided and staff was encouraged to visit the website.

Ongoing communication were recognized as critical, so communication plans were discussed during the training visits. Participating Resource Centers designated a DementiaCare contact person for clients as well as for the Caregiving

Alliance. It was made clear to staff that all questions were welcome at anytime. After the training, communication between the main office and the sites continued. The DementiaCare project manager and a technical expert on staff at Caregiving Alliance provided technical assistance and customer service to answer caregiver and professional inquiries, and to help the Resource Center contacts and staff with program operation questions. Regular e-mail follow-up, quarterly conference calls, and DementiaCare updates at Resource Center staff meetings were used as mechanisms for communicating information, sharing strategies, and solving problems.

Site visits for the training were ongoing as the new website was launched. Intake data was determined to be sufficient to allow for program enrollment. Assessments were no longer required. A postcard was mailed statewide to caregivers announcing the availability of the new program using mailing lists from each Resource Center. Online registration for DementiaCare was established that same year. One month after the launch of the new website, the foundation turned down the extension request, citing lower than preferred service numbers and a new policy against grant extensions. Fortunately, most of the individual Resource Centers had already committed to providing funds for ongoing program operations. Without the support of the foundation, however, it was necessary to continue the search for additional funding so that DementiaCare could be offered along with other caregiver services.

FOCUS ON: Implementation – *Training for Staff*

Recognizing that staff and clients are users of the technology, gearing the implementation to meet staff as well as client needs is a critical component for success. The DementiaCare project manager suggested the following guidelines for training implementers of a program like DementiaCare. (1) Know your users. Find out what is important to them, and what they may find alien or intrusive. (2) Be aware of the goals, needs, and day-to-day challenges of staff. (3) Point out how the technology will benefit them. (4) Invite them to participate in the process, give input on the technology, and contribute to the content. (5) Keep them posted on progress and other issues of interest to them. (6) Conduct on-site group training sessions only when full attendance is assured. (7) Always secure the name of a staff person designated as the contact for the program.

Within the first year of the re-implementation, DementiaCare grew from serving 130 members to serving nearly 400. A subtle but perceptible shift took place in the Resource Centers regarding their use of technology and the expectations of use by their caregiving clients. New hires were expected to be competent with a computer. Intake staff began to regularly ask new clients if they had a computer and recorded client e-mail addresses. In preparation for a new Resource Center electronic client record management system, direct service staff at some Centers requested and received laptop computers, resulting in more convenient and immediate data entry. DementiaCare became a regular agenda item at staff meetings, and those without access to the program began requesting it.

Caregiving Alliance began this project with four objectives: (1) decrease the caregivers' sense of isolation by providing connections to other caregivers and the Resource Center family consultant; (2) increase caregivers' access to information and advice in issues relating to caregiving; (3) increase caregivers' coping and planning skills; and (4) develop, implement, and evaluate an effective Internet-based service delivery system for the caregiver population that is capable of wider replication.

In the first two-and-a-half years after the initial site launch, Caregiving Alliance saw anecdotal information indicating that the caregivers felt a reduced sense of isolation and a greater feeling of connectedness to other caregivers through DementiaCare. Increased access to information and advice was also recognized. Data was too limited to clearly show what impact DementiaCare had on caregiver coping and planning skills, but it was hoped that future customer satisfaction surveys and other feedback would offer some new more comprehensive insights into the perceived effects of DementiaCare by caregivers.

## 12.7. Analysis

The following sections show how this case study illustrates the implementation model presented in Chapter 5, Implementation Model Development and Testing. Each factor in the model is described as it played out in the implementation of DementiaCare.

### *12.7.1. Organizational Environment*

The environment in which DementiaCare was introduced presented both advantages and challenges. Caregiving Alliance is based in a city in which Internet technology and its uses were rapidly expanding during the time DementiaCare was being designed and launched. The leaders of Caregiving Alliance were considering how the Internet could help caregivers even in the early 1990s when the Internet was new to most people. When DementiaCare was first being designed and launched in the late 1990s, the culture of health care and social service organizations was still not ready for the changes in communication methods that the use of computers and the Internet would bring about. Furthermore, Caregiving Alliance had locations spread throughout the state, and the geographical separation from the developers of CHESS made cooperation and collaboration more challenging. But as the Internet became more popular with the public, so did Caregiving Alliance's website see increasing use with both caregivers and staff.

### *12.7.2. Organizational Motivation*

Caregiving Alliance was an organization with strong motivation to use a program like DementiaCare because it helped to resolve some of the access problems faced by Resource Center staff and it had the potential to enhance their efficiency in the face of increasing numbers of caregivers in need. For instance, caregivers generally have little free time. The 24/7 availability of the Internet would help address that concern. Caregivers often have difficulty finding care relief options, but if they can access services from their homes, the need for care relief would be reduced. Caregivers who live in rural areas or have no means of transportation cannot easily get to locations where help is available. The Internet would reduce the need to travel. Caregiving at home also isolates caregivers in their homes. The Internet would provide support and a link to the "outside world" that could help them cope with the isolation. Additionally, the number of caregivers in the state was growing. As more adult children from the "baby boom" generation began caring for their aging parents, the more Resource Centers would need to find more efficient ways to serve their clients.

Organization leaders worked hard to identify and remove barriers to successful implementation. They had initiated the project and they wanted it to succeed. For example, the implementation of the initial DementiaCare module uncovered barriers that were addressed in the relaunch of DementiaCare.

One recurring barrier was securing adequate funding. Project costs were initially estimated at $455,000 for 30 months. After months of looking for funding, however, the grant that was received was for $332,800 for 24 months. This represented a shortfall of $1,300 per month. Again there was a struggle to find resources when they wanted to expand use of DementiaCare statewide. Additional funding was requested from the foundation. Meanwhile, participating Resource Centers contributed at least $5,000 each. By winter, word came back that they would not receive additional funds from the foundation, so DementiaCare had to make do with the individual Resource Center contributions and other small grants. Without the expertise and connections of Caregiving Alliance and the CHESS developers in finding and administrating grant funds, the project may not have had the necessary resources.

LESSONS LEARNED

Caregiving Alliance found electronic service delivery to be expensive. They are working toward **a critical mass of users that will make the program more cost effective**. They have also found that **open source works well as an infrastructure platform and is more manageable over time** as opposed to software requiring an annual licensing fee.

### *12.7.3. Technology Usefulness*

DementiaCare generally did a good job of meeting the needs of caregivers, but there were some complaints. Some Resource Center staff reported complaints of out-of-date information. When the program was redesigned, it incorporated a feature that made updating information easier. For those who had computers and Internet access, DementiaCare was affordable and convenient to access. But not all caregivers could afford computers and Internet access, so the Resource Centers provided them to the extent they could. Eventually, however, none of the Centers had the finances or staff time available to continue to offer computers or Internet access. They also found they could not provide computer training within the context of the DementiaCare implementation, although Caregiving Alliance offered technical assistance over the phone.

LESSONS LEARNED

Following are some things that Caregiving Alliance and the Resource Centers learned as they worked to discover and meet the needs of caregivers with DementiaCare:

- **Accurate, in depth, useful content** gains user trust. **Material that is quick and easy to find** keeps them interested. **Interactive features** keep users coming back to a website.
- **Easy to understand, patient technical assistance that is always available** is a valuable user retention tool. Be prepared to respond to both skilled users and those brand new to computing.
- There will always be something new and better to add to a website. **Consider how the change will benefit the user** before assuming it is a "must have" feature.
- **Integrating online service with community based service** offers the ultimate value to the consumer.
- Building an active discussion group is an art and science. Using a lay facilitator (e.g., former caregiver) can help to **initiate peer-to-peer communication and group ownership**. The DementiaCare project manager also felt that limiting the participation of Resource Center staff to "read-only" (i.e., they could not post messages to the discussion group) furthered this goal.

### *12.7.4. Promotion*

Promotion to the public started as soon as the grant did, with a press release, articles, presentations at conferences, and the preparation of marketing materials for the Resource Centers. This continued throughout the implementation. Family consultants were to inform clients about DementiaCare, including it in their care plans. When the second wave of implementation began after the site redesign, it was determined that a full assessment was no longer needed, so all caregivers would be eligible to enroll once they became associated with a Resource Center by providing basic intake information. At this point, cards were mailed to all the caregivers on the Resource Center mailing lists statewide. Organization champions worked hard to push the project forward throughout the implementation. They kept the lines of communication open between the main office and the Resource Centers by regular teleconferencing and individual phone consultation in order to encourage staff to enroll their clients and to share information on the progress of the implementation.

LESSONS LEARNED

Caregiving Alliance found that **Internet based services are less visible to potential users than community based services**. Therefore **periodically e-mailing users** offering useful site updates and other concrete information helped to promote use. Within the Resource Center system, **peer contacts were designated at each site** to promote use by facilitating communication between the Resource Centers and the central office regarding the progress of the implementation and changes to DementiaCare itself.

### *12.7.5. Implementation Process*

During the first six months of the grant, staff was trained in how DementiaCare worked and what the implementation procedures would be. They were instructed to record client e-mail addresses at intake, and consultants were to include DementiaCare as part of the care plans for caregivers when appropriate. As the implementation proceeded, on-site presentations were made in order to keep staff thinking and learning about DementiaCare. Through discussions at these site visits, as well as through surveys and interviews with staff, it was discovered that there was some resistance to incorporating computer communication in general, and DementiaCare in particular, into the everyday work of the Resource Center staff. The training program addressed this resistance, which made a significant difference. Increased comfort with computer use by the community at large also contributed. A staff member at each Resource Center was identified as the DementiaCare point person for that site in order to facilitate communication within the Centers and with Caregiving Alliance. As a result of these efforts, DementiaCare became part of standard procedures for the participating Resource Centers. The thoroughness of the implementation of the redesigned site played a major role in integration of DementiaCare into the organization.

LESSONS LEARNED

The training program was successful largely because it was designed on the premise that **acknowledging and addressing barriers to acceptance of Internet technology by care professionals leads to greater success in the adoption and use of online services.** It is important not to belittle the inherent anxiety on the part of staff. **Recognizing that change happens over time, the manager looked for opportunities to celebrate and praise.**

Another factor that helped significantly was the focus on continually improving DementiaCare and the processes used to implement it. For example, at first the registration process was perceived as cumbersome and requiring too much paperwork. As time went by, the problems with the process were brought to light and improvements made. For instance, enrollment evolved from using a mail-in form to self-registration online. Caregiving Alliance continued to seek feedback from both caregivers and Resource Center staff through annual customer satisfaction surveys of both groups.

LESSONS LEARNED

The implementation of DementiaCare illustrates the value of **responding to feedback** so users, clients and staff know how the problems they identified are being addressed. **Build in time and financial resources** to accommodate process change and to adopt newly available technology that clearly offers improved functionality.

Caregiving Alliance staff found it difficult to customize DementiaCare to fit their needs when they did not have control over programming and design. Although taking over complete responsibility for DementiaCare meant more work for the organization, it allowed the customizability necessary to make changes that had been suggested by surveys and interviews with staff, and anecdotal feedback from users.

### *12.7.6. Department–Technology Fit*

Initially, DementiaCare did not fit well into the Resource Centers. First, there was resistance from some to online service delivery. Some of the comments received during site visits helped to uncover this quiet but powerful barrier. According to Briggs and Kindler, “Even though the obtaining and processing of information has always been an integral part of social work practice, workers have been slow to use computers for those purposes.” [1] Some on staff were unfamiliar with computers, while others felt computers would not benefit their clients.

Still others felt that the use of DementiaCare threatened to usurp their role as family consultants. Fueling some of their concerns were technical problems with browsers and Internet service they had heard about. However, DementiaCare was not a difficult program to fit into what the Resource Centers already were doing. Caregiving Alliance had initiated the implementation and was pushing it, providing support and encouragement for it along the way. After a few years, DementiaCare evolved sufficiently to fit well with the services and procedures of the Resource Centers.

LESSONS LEARNED

In the initial implementation of DementiaCare, Caregiving Alliance found that they were not able to easily make the changes that were suggested by the feedback they were receiving from staff and users. The agreement with CHESS and the module design were not flexible enough to meet these needs. In order to make DementiaCare a lasting success, **Web feature development and problem solving needed to be constant and ongoing**.

### *12.7.7. Key Personnel Awareness and Support*

The participating Centers were aware of DementiaCare as they began implementation, but their understanding of how it would be implemented and used was not always complete. As those who were unsure about DementiaCare, or who had resisted it, had their concerns addressed and saw how caregivers could benefit from using the program, more and more staff began to recommend DementiaCare to their clients. The designated DementiaCare contact at each Resource Center helped to answer queries immediately about the program and keep it visible. For example, one consultant said, “I felt more comfortable recruiting when I learned that it was intended to be an additional resource, not one to replace staff.” Once the staff felt ownership for the program, it was much easier to increase awareness of, and support for, DementiaCare within the Resource Center system.

## Conclusion

DementiaCare was developed and deployed to a statewide family caregiver audience – an accomplishment far greater than could have ever been imagined, given the complexity of the service delivery model. It appears that the Internet is an effective medium for delivering caregiver services. However, more in-depth research studying caregiver use of DementiaCare, decision making, perceived impact on coping, and self efficacy, as well as how online service delivery may differ from face-to-face interactions, would contribute to the development of more objective, concrete information.

## *References*

1. Briggs, P., Kindler, P. (1993). Bridging the Gap between Information Technology and Human Services. Computers in Human Services, 9 (1–2):197–205.

# 13

# Key Learning and Advice for Implementers

David H. Gustafson and Patricia Flatley Brennan

As patients assume an increasingly active role in their own health care, hospitals and health care systems will rely on computer technologies that extend traditional health services directly to patients. This book presented a description of an innovative interactive health communications system (IHCS), CHESS, described the theories that can guide institutions through the adoption-to-implementation process, and documented the degree of success experienced by six institutions experimenting with this novel, technology-supported approach to patient care. In this chapter, we summarize the key lessons learned from these experiences, and offer guidance to institutions that are interested in expanding their approach to patient care through judicious use of interactive health communication systems.

To the institution, these systems appear in many forms – as CD-ROM or DVD-delivered health education programs, electronic health records, or websites and portals that offer provider-sponsored services. To the patient, these systems may appear as Web-portals through which they can review sections of their medical records, messaging services that allow them to send and receive secure communication with their clinicians, other experts, and peers facing similar health issues, or CDs or DVDs provided by their clinicians to take home and review. Whatever the medium, deployment of IHCS, a technology intended for direct use by patients, requires an investment of institutional resources. Systematic approaches to implementation insure that the optimum benefit of these innovations occurs.

The IHCS represents the latest in a series of computer technologies designed to improve the quality and accessibility of health care. Health care institutions invest in an IHCS for a variety of reasons. Sometimes market factors stimulate the investment. Hospitals often desire a "web presence" to draw potential customers in as well as to serve their patients better. Having a web-presence may provide a marketing edge not available through other media. An IHCS differs from other computer applications in health care, like automated billing systems or computerized provider order entry systems; because patients are the intended users, planning for and deploying an IHCS requires special consideration by the institution. As with any other innovation, particular attention must be given to the strengths and weaknesses of the institution, its capacity to support the implementation, and the fit between the innovation and the institution's goals.

This text moves the consideration of IHCSs from a behavioral change orientation to an organizational implementation perspective. The behavioral change perspective [1] examines how IHCS stimulate and foster individuals toward achievement of health goals. An organizational implementation perspective considers how the character of an organization facilitates or interferes with implementation, and then examines how organizational resources such as time, personnel, and policies shape the implementation of the intervention and therefore their likelihood of success. The organizational implementation perspective is unique and not taken by many studies. Many studies provide good evidence that an IHCS can assist patients to understand their illnesses, gain social support, and participate more fully in their health care; this evidence is necessary but not sufficient to demonstrate how to institutionalize these innovations. Institutionalization is essential to gain full value from the IHCS. We believe that sustained institutional investment is essential to make even the most clinically significant innovations really work.

Whatever the starting point, guiding an IHCS innovation from adoption through institutional acceptance requires careful attention to the implementation process. Few models exist to guide the institutional investment or to direct institutions to the “best practices” for assuring successful implementation. This book’s goal has been to address the urgent need for health care facilities to adopt and successfully implement consumer health informatics innovations. By using expert advice and sound theories of design, adoption, diffusion of innovation, and organizational change, we developed a 42-element model that predicts implementation success. We then applied that model to the study of six separate institutions that were engaged in implementing an innovative IHCS program – CHESS.

## 13.1. A Model for Implementation

Implementation of IHCS innovations like CHESS should be viewed as a process, not a single point in time. Union Hospital illustrates what happens in many institutions when an innovation is first embraced. A champion or key clinical leader becomes aware of the innovation, sees its potential, and recognizes that a fair test of the innovation’s value requires more than instituting the practice in his or her own clinical service. The champion then convinces colleagues to adopt the innovation. Thus, the “adoption” decision may originate with a single visionary with sufficient power to initiate the organizational adoption process. The details of the implementation then fall to the group where the IHCS will actually be used.

Through a four-part process (literature review, expert panel, validation test with 400 respondents, and prospective evaluation of its predictive ability with 25 implementations), our team developed a “Readiness for Implementation” model to predict IHCS implementation success in health care facilities. Funding support for the development was received from the Agency for Healthcare Research and Quality (AHRQ). This model has seven factors and five or more elements characterize each factor. Table 13.1 summarizes the factors, their definitions, and the associated elements.

TABLE 13.1. Readiness for Implementation Model.

| Model Factor | Definition | Elements |
|---|---|---|
| Organizational Environment | State of the institution | Organizational history of innovation<br>Leader innovativeness<br>Internal turbulence<br>Within-department cooperation<br>Between-department cooperation<br>Influence of external health care environment |
| Organizational Motivation | Extent to which the innovation fits with institutional goals, resources, and support | Fit with key organizational goals<br>Costs and savings from the technology<br>The technology's ability to solve a key problem<br>Patients' expressed needs for the technology<br>Corporate administrator support<br>Resources for implementation |
| Technology Usefulness | Quality of the innovation and the availability of help | Regularity of updates<br>Affordability<br>Convenience of access<br>Ease for patients to find what they need<br>Technical help for users and staff<br>Some efficacy data supporting usage |
| Promotion | Presence and influence of institutional champions and communication channels | Promotion within the organization and to patients<br>Corporate champion existence<br>Corporate champion influence<br>Department champion existence<br>Department champion influence<br>Regular progress reports |
| Implementation Process | Robustness of the implementation strategies | Technology is part of standard practice guidelines<br>Customizability<br>Processes to identify, refer, and support users<br>Implementation role training for staff<br>Feedback used to remove barriers and improve processes |
| Department – Technology Fit | Extent to which the innovation fits with departmental processes | Home department of technology respected<br>Implementation started in unit where it will likely be successful<br>Good fit with other services/procedures<br>Technical difficulties<br>Staff familiarity with the technology<br>Effect on staff workload<br>Effect on care provider role |
| Key Personnel Awareness and Support | Ongoing internal marketing and enthusiasm for the innovation | Key opinion leader support of the technology<br>Department manager support<br>Key persons' understanding of implementation and use<br>Clinicians see their patients are benefiting from technology<br>Clinicians' advice for patients to use technology<br>Powerful skeptics' concerns are addressed |

## 13.2. Vision and Direction for This Chapter

The present chapter has two goals: first, to glean the lessons learned from the case studies in this book by organizing the experiences of the six institutions according to the parameters of the model, and second, to provide guidance and suggestions to health care administrators, service planners, and clinicians regarding how to evaluate an organization's readiness to implement an IHCS and where attention should be placed to strengthen the organization's likelihood of success.

### *13.2.1. Lessons From the Case Studies*

We applied the model of innovation implementation to six institutions that committed to the implementation of CHESS. We conducted interviews with key informants to determine the state of each element from the model in that particular institution and to gain an assessment of the respondents' views of the success of the implementation. In doing so, we made every effort to be open and self-critical in order to present a useful set of insights for the reader. It should be noted that the assessments we present come after months of discussion and debate among the research team and we believe the results represent a thoughtful and accurate representation of the most effective way to implement an IHCS within institutional health care settings.

Table 13.2 summarizes the six case studies on the seven factors from the implementation prediction model. Each column summarizes one case experience. The

TABLE 13.2. Subjective summary of impact of factor on CHESS implementation.

| Factor | Associated Practice | Strand Hardin | Grace | Caregiver Resource Network | Union | Simpson |
|---|---|---|---|---|---|---|
| Organizational Environment | weak$^{+}$ | $-$ | $+$ | weak$^{+}$ | weak$^{-}$ | $+$ |
| Organizational Motivation | $-$ | weak$^{+/-}$ | $+$ | $+$ | weak$^{+}$ | $+$ |
| Technology Usefulness | weak$^{-}$ | weak$^{-}$ | N | weak$^{+/-}$ | weak$^{+}$ | $+$ |
| Promotion | weak$^{+}$ | weak$^{-}$ | $+$ | $+$ | weak$^{+/-}$ | weak$^{+/-}$ |
| Implementation Process | $+$ | $-$ | weak$^{+/-}$ | $+$ | $+$ | $-$ |
| Department – Technology Fit | $-$ | $-$ | $-$ | $+/-$ | $+$ | $+$ |
| Key Personnel Aware/Support | $-$ | weak$^{-}$ | $-$ | weak$^{+}$ | weak$^{+}$ | $+$ |

Level of Success

Low ——————► High

| | |
|---|---|
| $+$ | positive effect on overall level of success |
| $-$ | negative effect on overall level of success |
| $+/-$ | effects in both directions |
| N | no information |

columns are ordered left to right reflecting a global assessment of implementation success. That is, the implementation at Associated Practice was least successful, followed by Strand Hardin, Grace Hospital, Caregiver Resource Network, Union Hospital and ending with Simpson as the most successful implementation. Clusters of successful implementation are evident, with Simpson, Union, and Caregiver Resource Network being largely successful and Grace Hospital, Strand Hardin, and Associated Practice comprising the less successful cluster. The indicators in each cell describe the impact of institutional performance on each of the seven factors of the implementation model at the time when this analysis was completed and overall how each factor contributed to the success of the implementation of CHESS at that institution.

Success of an IHCS may occur even if an institution performs poorly on one or more factors (or several elements within a factor). Institutions that had successful implementations had an overall pattern of strong, positive performance on most factors, even if they performed poorly on one or two factors. Institutions with less successful implementations had very poor performance on many factors and good performance on only one or two. Note from Table 13.2 that Simpson had a relatively weak implementation strategy. However, strong organizational support, organizational motivation, and the ability of the technology to meet user needs combined to insure that the innovation was successful. This suggests that the model factors are compensatory for each other, and an institution planning to implement an IHCS might find success by strengthening already strong factors as well as building up weak ones.

Good performance on any single factor did not insure the success of the implementation, and poor performance on any single factor did not prevent successful implementation. Additionally, all factors and the elements that comprise them play important roles in the implementation. For example, note that in Table 13.2, Associated Practice had a less successful implementation overall than Strand Hardin, as indicated by the order of the columns' appearance. However, more pluses appear in the cells in Associated Practice's column than in Strand Hardin's column. The apparent contradiction occurs partly because of the fact that the table is summarizing many factors over several years. Associated Practice had some stronger implementation characteristics at the beginning of the implementation that turned more negative as time went on, and hence, their level of success decreased over time. Strand Hardin, on the other hand, had a few well-timed bursts of positive levels on a few key factors, which was just enough to make it overall a more successful implementation than Associated Practice. If one would have looked at some snapshots of these indicators at certain points in time for Strand Hardin, the picture would have looked much more positive. The full stories were told in Chapters 7 and 9. Since all elements do play an important role in implementation, it is useful to "drill-down" and examine the performance of the institution on each of the individual elements. Table 13.3 summarizes the performance of each institution on all 42 elements.

While Table 13.3 gives a good deal of detail about each implementation, it still is very much of a summary of what happened in each organization. Each cell

TABLE 13.3. Model matrix with case studies ordered from least successful to most successful.

| Factor | Element | Associated Practice | Strand Hardin | Grace | Caregiver Resource Network | Union | Simpson |
|---|---|---|---|---|---|---|---|
| Organizational Environment | Organizational experience with innovation | + | +/− | +/− | Not present or not applicable | + | + |
| | Leader innovativeness | + | − | + adoption only | + | +/− | +/− |
| | Internal turbulence effect | + (no impact) | − | − | + (no impact) | + (no impact) | + (no impact) |
| | Within-department cooperation | + In CHESS home dept it was good initially, − bad later; − one clinical department | − hurt BC | + Regional hospital − Cardiac center | Not present or not applicable | − | + |
| | Between-department cooperation | +/− | Not present or not applicable | − | +/− | − | + |
| | Influence of external health care environment | +/− | +/− no influence | + adoption | + | − | + |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Organizational Motivation | Fit with key organizational goals | + early − later | +/− Unclear goals due to leadership change | + initially, less after new CEO | + | + | + |
| | The technology’s ability to solve a key problem | − | − | + need with early patient discharge | + | + | + |
| | Costs and savings from the technology | − | − | − | Not present or not applicable | − | Not present or not applicable |
| | Patients’ expressed needs for the technology | − early on no demand | +/− | + | + Varied among sites | + BC | +/− |
| | Corporate administrator support | + early − late | + led to adoption; repeated effort | + initially, then not | + | − | Not present or not applicable |
| | Resources | − | − | − | − Limited at the end | + BC/PC − HD | + |
| Technology Usefulness | Regularity of updates | − HIV out of date + others | − | N | − initially + later | +; −HD | − |

*(Continued)*

TABLE 13.3. *(Continued)*

| Factor | Element | Associated practice | Strand hardin | Grace | Caregiver resource network | Union | Simpson |
|---|---|---|---|---|---|---|---|
| | Affordability for patients | + | + | +/− Varies – some donations of equipment | + initially − later | + | + |
| | Convenience of access | + | − initially + later with Internet | N | − initially | + | + |
| | Ease for patients to find what they need | − | − | N | +/− | Not present or not applicable | Not present or not applicable |
| | Technical help for users and staff | + implementation team support; − developer support | − | − | + available later | Not present or not applicable | + |
| | Usage rates | − | − | − | Not present or not applicable | + BC − HD | Not present or not applicable |
| Promotion | Promotion within the organization and to patients | + | − | + within org − to patients | + more at the end | +/− | + |
| | Corporate champion existence | + initially; then − | +/− | + | + | +/− | − |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Promotion | Corporate champion influence | + early<br>− later | − | + early | + | + | − |
| | Department champion existence | − not in clinical depts.<br>+ home dept early, − later | − BC did not exist; + Internet | − no docs, a few nurses | +/− Varied across orgs | − | + |
| | Department champion influence | − | − | Not present or not applicable | Not present or not applicable | +/− | + library; − other |
| | Regular progress reports sent | − | − Internet: lost attention of champions | Not present or not applicable | + in 2nd phase | − | − |
| Implementation Process | Technology in standard guidelines | − | − | + BC − HD | + | + BC | − |
| | Customizability | + | + | − | − | + | − |
| | Processes to identify, refer, and support users | − | −research protocol with restricted criteria | − CHESS completed with other research studies for staff attention | + | + | − |

*(Continued)*

Table 13.3. *(Continued)*

| Factor | Element | Associated practice | Strand hardin | Grace | Caregiver resource network | Union | Simpson |
|---|---|---|---|---|---|---|---|
| | Implementation role training for staff | + | − | + regional | + | + provided, but − not trained early enough | − |
| | Feedback is used to remove barriers and improve processes | + (clinicians)<br>− (patients) | − | Not present or not applicable | + | +/− | +/− |
| Department-Technology Fit | Home department respected | − eventually | + Internet delivery good fit | − orphan dept., no connections to depts. that might use CHESS | + | + | + |
| | Implementation started in unit where success likely | − | + but ended up badly | Not present or not applicable | − better to start with fewer implementations | + | + |
| | Fit with other services/procedures | − | − | − | + | −<br>+ preventive cardiology | + |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Department-Technology Fit | Technical difficulties | +/− | − slowed BC recruiting, training, undercut use & champions | − | − | Not present or not applicable | − |
| | Staff familiarity with the technology | − | − | +/− varies | − | +/− | + |
| | Effect on staff workload | − | − | − increased due to recruitment | − increased due to installation | Not present or not applicable | − |
| | Effect on care provider role | − clinicians were threatened | +/− Most clinicians did not see it threatening | Not present or not applicable | − Lots of fear at first | − clinicians were threatened | Not present or not applicable |
| Key Personnel Awareness & Support | Key opinion leader support of the technology | + early<br>− later | +/− | +/− | + eventually | +/− | + |
| | Department manager support | + early<br>− later | +/− | +/− | + eventually | + | + |

*(Continued)*

TABLE 13.3. *(Continued)*

| Factor | Element | Associated practice | Strand hardin | Grace | Caregiver resource network | Union | Simpson |
|---|---|---|---|---|---|---|---|
| | Key persons' understanding of implementation and use | − too resource intensive | − | − | + eventually | Not present or not applicable | + |
| | Clinicians see their patients are benefiting/not affected | − | − | + regional | + eventually | + | + |
| | Clinician advice for patients | +/− | +/− | +/− | + eventually | +/− HD<br>+ encouraged BC use | +/− |
| | Powerful skeptics' concerns are addressed | − Clinicians remain skeptics | − | − | + Concerns addressed eventually | Not present or not applicable | + concerns addressed |

| | | |
|---|---|---|
| + | positive effect on overall level of success | BC—CHESS breast cancer module |
| − | negative effect on overall level of success | PC—CHESS prostate cancer module |
| +/− | effects in both directions | HD—CHESS heart disease module |
| N | no information | |

represents a summary of that particular factor at that particular institution over a period of years, during which the actual level of the factor could have varied widely. In addition, within a single institution, an IHCS like CHESS may be more successful in some areas than in others, and each area probably should be considered a separate implementation project. We observed this in two ways – first, implementation success varied by the nature of the clinical population; second, the success of the implementation varied by the characteristics of the department where the innovation was housed. For some clinical populations in some organizations, such as patients with breast cancer, clinicians and patients alike embraced the CHESS intervention. It is possible that in these successful clinical practice groups there was a better fit between the nature of CHESS and the way it supported patient concerns (e.g., communication). The unique culture of various specialty groups may be a key deciding factor predicting or insuring implementation success.

When the IHCS was housed within a clinical specialty practice, its implementation was more successful. The Grace Hospital case study illustrates how CHESS actually stimulated the development of a new cardiac rehab program. When housed within general management or marketing arms of the organization, the innovation was less fully implemented. While this may be related to how well the IHCS supplanted or supported existing clinical services, it may also have been related to the coherence of the focus of the clinical practice. That is, within a specialty clinic, there is a small, well-understood set of clinical goals to be accomplished and it is easier to see how the innovation could be of assistance. Even in a general education area (e.g., Simpson), where both common principles of patient education and specialty-directed interventions are used, the IHCS could be a good fit, and therefore less challenging to implement. But when the IHCS was located in a non-clinical area, such as marketing, the goals of the department at times conflicted with the goals of the IHCS which made it difficult to implement.

Characteristics of the department, independent of the nature of the clinical practice, also influenced how successfully the IHCS was implemented. Where a high degree of trust existed between the staff, there seemed to be a strong willingness to try the implementation and approach creatively the challenges of the implementation. When a strong esprit de corps was present, team members complemented each other in the various tasks needed to insure the implementation.

Success of an implementation in a single area of a practice or given division might not translate to organization-wide implementation spread. It is possible that local practice groups held unique criteria about success – thus success of an implementation may be appraised both at the level of the local practice group and the organization as a whole. This suggests that clear expectations of the innovation (i.e., Is it designed to fill a need in a special practice group or designed to serve a broad and complex set of goals for an institution?) are needed to determine just how one measures innovation success.

Another form of success was observed in two of the organizations (Simpson and the Caregiver Resource Network). Although CHESS was not sustained, both organizations used their CHESS experience as a stepping stone to development of an IHCS specifically for their organization. The use of a locally developed IHCS expanded their ability to update the system in a timely way and to highlight local resources and use language that is familiar within the organization.

At least two organizations (Union and Associated Practice) reported disappointment that only about 27–30 percent of its patients actually used CHESS. Yet these levels are considered successful in other diffusion efforts. For example, the introduction of electronic medical records (EMR) has progressed very slowly. In 2004, only 13 percent of 1200 small medical practices had implemented EMR, with 32 percent expressing interest [2]. Hence it is important to clarify at the onset what is reasonable to expect in terms of implementation and also of use.

## 13.3. Gestalt: Implementation Success Depends on the Whole Set of Factors

Implementation of an IHCS occurs through a process that evolves over time. Yet, no organization remains fixed. Because of both the implementation and other events and influences in the organization, the institution itself is dynamic and ever changing. Successful implementation depends on the trajectory of development of the institution that is changing, and changed by, the adoption and implementation of an IHCS.

## 13.4. Special Considerations for Research-based Innovations

Our observations arise from the deployment of a research-based innovation, CHESS. Institutions were encouraged to provide guidance and direction to the developers. In essence, the innovation itself was continuously evolving. In a way, this reciprocal design-deployment relationship could insure that the innovation became tailored to the needs of the practice group within which it was deployed. While such tailoring may have insured acceptance in a given area, it may have precluded deployment to other services within the institution. We believe that the IHCS is most effective when it addresses the most common problems found in the patients who get care at the organization deploying the IHCS.

Often research projects come with outside funding to support them. Such has been the case in several of the CHESS implementations (e.g. heart disease at Grace). These funds have the advantage of providing resources needed to get a project started. But once these funds run out, continuation depends on finding replacement funding. An organization that has not been required to provide funding from the start may find it hard to provide resources later on.

One thing that stands out in these case studies is the multiplicity of barriers that arise in an organization-based IHCS implementation. Champions come and go as do senior leaders. Departmental homes for IHCS can shift. Clinicians do not march to one drummer. And while physicians may seem to be the key players, in reality it is often the nursing staff who really carry the message to potential IHCS users. In a sense, it should be no surprise that technological innovations often fail in health care. Perhaps the real surprise is that given the right mix of factors, implementation can succeed.

To the extent possible, it is helpful to find ways to improve access to IHCS that require no effort on the part of clinicians. We can point to many instances where a clinician has been very supportive of CHESS, yet rarely ever referred patients to the program. Physicians and nurses are very busy people with very little time to spend with patients, and often do not take the time to talk about using an IHCS.

## 13.5. Using the Readiness for Implementation Scale for IHCS Implementation

This book presents a model for implementation derived from theory, formalized through expert judgment, and validated through field evaluation. The model has been developed into a tool for organizations, the Readiness for Implementation Scale (RIS). While the cases presented served to illustrate elements of the model and their contribution to the successful implementation of CHESS at these six institutions, it also now provides a framework for planning the adoption and implementation of an IHCS more generally. This has been shown in our prospective evaluations with many different IHCS in 25 different settings [3].

### *13.5.1. What Does the RIS Actually Tell an Organization?*

The RIS helps an organization understand itself. Surveys are administered to a cross-section of staff affected by the IHCS implementation. Staff responses are combined using the RIS scoring system. The model predicts and explains how likely it is that the organization will produce a successful implementation. Effective implementation of an IHCS is a process of matching the nature of the system, the characteristics of the organization, and the resources provided to insure that it becomes a part of routine care. The model serves to identify the seven key points of implementation and address characteristics of both the organization and the implementation, including the strategies needed to insure its integration into practice.

### *13.5.2. How to Use the RIS*

#### 13.5.2.1. Self-study: Organizational Readiness to Implement IHCS

To apply the model, one must first define the organization wherein the IHCS will be deployed. The “organization” might be the entire institution or a well-delineated part of the organization, like a clinical service or a product line. Next one must consider the success target – does the institution hope to increase its portfolio of services for a given population? Experiment with novel technologies?

Accomplish a specific organizational mission? Test a given IHCS? What level of penetration should be considered a success? While the success target may vary, the model elements remain constant.

The model identifies the seven key areas of an institution that must be appraised to determine the ability of the organization to make a commitment to adopting and implementing IHCS. Each factor is broken down into several elements that provide detail and definition for the factor as well as direction on what areas to assess in the organization. Each of these 42 elements within the model are further detailed by specific indicators that our experts identified as influential in the implementation of an IHCS. The likelihood of successful implementation, however, may be more of a function of all of the elements together rather than any single element serving as a bell-weather of prediction.

## *13.5.3. Collecting Data for the RIS*

A survey to collect data needed for the RIS is available in Appendix 13.1. Ideally at least eight people from the organization should complete the survey including members of the implementation team, the project champion, and internal customers of the implementation process (clinicians, administrators, department managers, etc.). Each respondent assesses how the organization functions on each element. The next section describes the process for calculating the results of the surveys in order to have useful feedback about the IHCS implementation.

We suggest that the RIS be used during the process of deciding whether to adopt an IHCS, during the implementation planning, six weeks after actual implementation begins, and annually thereafter. Results should be examined to determine how the implementation could be (re)structured to maximize chances of long- and short-term success. Differences in opinion highlighted by the survey should be explored as much as possible to reach a consensus on what accurately portrays reality.

### 13.5.3.1. Calculating RIS Scores

After the surveys have been completed, there are several steps for calculating the organization's Global Readiness for Implementation score.

1. For each individual respondent, **score** each element within a factor on a (0, 1) basis. Sometimes an element will be appraised as 0.5 if the element has a "middle-of-the-road" response. Use the coding score listed by each survey response.
2. The scores of each element within a factor are **summed** for the *respondent's factor score*.
3. Once you have the seven factor scores for each individual respondent, you then calculate an **average** *factor score for the organization* by averaging the scores for all of the respondents. The information also provides a picture of particular areas to work on.
4. Use Table 13.4 to **convert** the *average factor scores for the organization* into the weighted values needed to calculate the *Global Readiness for*

Table 13.4. RIS conversion to overall score.

| Factor score | Organizational environment | Organizational motivation | Meeting user needs | Promotion | Implementation | Fit in department | Awareness support |
|---|---|---|---|---|---|---|---|
| **0** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **0.5** | 0.68 | 1.25 | 1.18 | 0.98 | 1.18 | 1.05 | 1.40 |
| **1** | 1.37 | 2.50 | 2.37 | 1.95 | 2.35 | 2.10 | 2.80 |
| **1.5** | 2.05 | 3.75 | 3.55 | 2.93 | 3.53 | 3.15 | 4.20 |
| **2** | 2.73 | 5.00 | 4.73 | 3.90 | 4.70 | 4.20 | 5.60 |
| **2.5** | 3.42 | 6.25 | 5.92 | 2.33 | 5.25 | 5.25 | 7.00 |
| **3** | 4.10 | 7.50 | 7.10 | 2.77 | 5.80 | 6.30 | 8.78 |
| **3.5** | 5.00 | 9.80 | 8.97 | 3.20 | 7.10 | 7.02 | 10.55 |
| **4** | 5.90 | 12.10 | 10.83 | 3.63 | 8.40 | 7.74 | 12.33 |
| **4.5** | 6.80 | 14.40 | 12.70 | 4.07 | 9.70 | 8.46 | 14.10 |
| **5** | 7.70 | 16.87 | 14.37 | 4.50 | 11.00 | 9.18 | 15.53 |
| **5.5** | 9.25 | 19.33 | 16.03 | 5.60 | N/A | 9.90 | 16.97 |
| **6** | 10.70 | 21.70 | 17.60 | 6.60 | N/A | 11.37 | 18.30 |
| **6.5** | N/A | N/A | N/A | N/A | N/A | 12.83 | N/A |
| **7** | N/A | N/A | N/A | N/A | N/A | 14.20 | N/A |

**Global score:** For each factor, please use the far left column of the table above to convert your factor score into the factor weighted utility needed to calculate your global RIS. Circle the appropriate factor utilities based on the corresponding organization's average factor scores calculated previously. For example, if your organizational environment has a factor score of 4.5, then the weighted utility for organizational environment is 6.8. The global RIS score will be the sum across all the factor weighted utilities that you circle.

| **Organization's average factor scores** | **Weighted utility scores** |
|---|---|
| Organizational environment _____ | _____ |
| Organizational motivation _____ | _____ |
| Technology usefulness _____ | _____ |
| Promotion _____ | _____ |
| Implementation process _____ | _____ |
| Department–technology fit _____ | _____ |
| Key personnel awareness and support _____ | _____ |
| **Global readiness for implementation score:** | _____ |

*Implementation Score*. Circle the appropriate factor utility based on the **average** *factor score for the organization* computed from the survey. For example, if the average factor score for the organizational environment has a score of 4.5, then the weighted utility score for organizational environment is 6.8.

5. The *Global RIS* score will be the sum of all the factor-weighted utilities that you circle. The higher the score, the greater the chance is of a successful implementation.

### *13.5.4. Identifying Targets for Strengthening the Organization*

Elements that indicate where the organization falls short of an ideal state might suggest points where investment in organizational change may alter the likelihood of a successful implementation. The seven factors provide points of assessment that could be monitored over the course of the implementation. Again, it is not the actual state of the organization on any given factor or element, but the total mix of factors (organizational status, implementation characteristics, and the resources provided toward making the IHCS a part of practice) which should be considered. We note that it will be important to apply the model several times during the implementation process to monitor progress and identify the modifications needed at that point.

## 13.6. Improving Implementation Efforts

Once an organization has had an opportunity to assess IHCS implementation efforts with the RIS, the next step is to examine how to improve or strengthen factors or specific elements with the most potential for success at the organization. Over time the RIS can assist the organization in keeping the implementation on track and make most of the resources available for the implementation effort. The implementation model also provides a universal way to communicate about the project within the organization.

### *13.6.1. Communications in IHCS Implementation*

#### 13.6.1.1. Developing an Effective Communication Strategy

One of the key elements to successfully implementing and sustaining change is to have an effective strategy for communicating the intent, design, testing, and implementation of the technology. When key people feel informed, they are much more likely to support the change. Hence, the key elements of a communications plan need to be developed before implementing the new technology. The development of this plan should focus on identifying: (1) the audience, (2) the objectives, (3) the message, and (4) the means of delivering the message. A table like the one presented in Table 13.5 may be helpful in planning a communication

TABLE 13.5. Communication goals and strategies.

**Leverage leadership**

| Audience | Objective | Message | Medium/Means |
|---|---|---|---|
| Senior Management | To promote shared responsibility and accountability for sustaining the technology | "Senior leadership support of the sustainability effort is expected and is important to its success." | Project manager helped identify issues for Senior Management discussion. CEO brought information from project team to Senior Management meetings as needed for discussion, final approval, and support. |

**Gain peer support**

| Audience | Objective | Message | Medium/Means |
|---|---|---|---|
| Middle Management | Convey the ongoing value of the project. Spread changes across the agency. Provide change leaders and team an opportunity for recognition. | "The project continues to be an important part of the agency's work… this is the progress we've made." | CEO requests time at middle management meeting agendas. He or she recognizes individuals and acknowledges value of work done. Then teams give updates using handouts, Power Presentations, and demonstrations of new features in IHCS. |

**Create awareness**

| Audience | Objective | Message | Medium/Means |
|---|---|---|---|
| Staff and Customers (Note: customers were largely internal.) | Create awareness of project and importance to the agency.<br>Demonstrate commitment to quality care.<br>Demonstrate commitment to the change.<br>Share project content and progress.<br>Recognize work of peers. | "IHCS changes infra-structures to support staff and better serve clients." "Improving our work will improve client service." "We will be a better place to work because of this project." "What does this project mean to me?" "Many staff are working together to make change." | Project manager and team leaders submit articles to newsletter. Project featured in CEO's monthly newsletter column. "Staff to Staff" Presentation at staff meetings by project team members. Word of mouth. |

*(Continued)*

TABLE 13.5. *(Continued)*

**Celebration**

| Audience | Objective | Message | Method/Media |
|---|---|---|---|
| Team members<br>External consultants<br>Funder<br>Potential funder | Sustain change initiatives.<br>Show management commitment to ongoing improvement.<br>Show success and thank staff.<br>Promote similar efforts. | "The "project" is ending, but the IHCS effort continues as part of work daily work."<br>"The project was successful in creating infrastructure to continue the change; here is how."<br>"Thank you for your help. Here is what we did and what we learned."<br>"This effort is necessary for healthcare organizations. | Special Meeting to signify "end" of the Project and formal transition to ongoing improvement efforts.<br>Teams review success and challenges, discuss how the project made a difference and review and prioritize remaining work.<br>Gave tangible rewards: Day off, paid training, "Thank you" letters to Staff by CEO. Written summary of projects and lessons written for team members and board. |

strategy. Column 1 lists the audience the communication is intended to reach. Column 2 lists the objective of the communication. Column 3 lists the key message to be communicated. Column 4 lists the medium and means by which the message will be communicated.

It is important to begin by assessing the existing communication system as well as the "communication culture" within the organization. Salade [4] suggests four questions to ask:

*Who are the primary audiences with whom you need to communicate for the technology to be successfully implemented and sustained, and what message(s) should they receive?* People to be reached include the senior management, implementation team members, staff and board of directors. However, each may be interested in different aspects of the project and most effectively reached by different methods.

*What resources currently exist to support communication?* Often existing meetings and taskforces can be used as well as a corporate newsletter, website or communications specialist. Many people may be already communicating by email or listservs. If so, it makes sense to take advantage of that medium.

*What is the most common method of communication inside the organization?* Different organizations communicate in different ways. Some rely on meetings that the implementation team can take advantage of to update key people. Some rely on written reports while others are overburdened with written materials. Some are comfortable using the Internet or email while others are not. It is best to use a communication mechanism that fits the people targeted for the communication. Certainly it makes sense to try new strategies like web conferencing which can reach many people in the organization and provides a way to demonstrate the IHCS. But the new strategies need to be tested to see how well they are working. For example, while PowerPoint was at one time a powerful and intriguing communication vehicle, its omnipresence has diluted some of its appeal.

*How can information be shared with external audiences?* While much of the communication and promotion activities will be focused internally, some external communications will be needed. For instance, patients need to become sensitized to the availability and value of the new technology. Payers might need to be encouraged to support the implementation. Hence it is again important to consider target audience(s) and the best ways to reach them. Sometimes the senior leaders need to share the experiences. Other times, team members are the best ambassadors. An external newsletter can be an effective communication medium to a targeted audience while press releases may help reach groups who would not otherwise know about the agency or its activities.

### *13.6.2. Creating Buy-in*

Buy-in was achieved at one organization by creating a name and logo that reflected the nature of the project and using them in all communications. The name "Darwin" was chosen as it implies an evolutionary, rather than revolutionary, program of improvement. Later in the process, maintaining a high level of support from key organizational staff was crucial. To communicate this, specialized strategies were designed. The message to top management (provided via PowerPoint presentations from the project manager) was that Darwin was an innovative approach that placed the organization at the cutting edge of technology in seeking ways to better serve clients and staff. But a more personal strategy (where the project manager met with the CEO) was used to test and refresh willingness to support project ideas, to list problem areas, and to seek feedback on the project's direction and speed.

### *13.6.3. Considering Cultural Components of IHCS*

There has been substantial research on needs of various underserved populations (and that research is expanding). IHCS developments are beginning to rely on this research to identify the minimum set of unique characteristics required for them to have their desired effect on different populations. For instance, the issue of language is receiving more attention. If we are to reach underserved Americans who are not fluent in English, how much adaptation is needed and how does that change among applications? Is it sufficient to simply convert from English to Spanish in order for the IHCS to have its needed effect? Would it be necessary to make culturally sensitive conversions such as respecting different dietary patterns, family structures, and collectivism? [5]

Some cultures are less likely to trust the traditional health care establishment and may place more trust in faith-based organizations or in traditional healers

[6, 7, 8]. An implementation plan that accounts for these cultural considerations increases acceptance not only by the target populations but also by agencies that can affect the diffusion of the IHCS.

Different cultures have different styles for making decisions. Some prefer to talk with people from their own culture who have made the decision. Others prefer to read about the issues on their own, while still others prefer to be led step by step through a decision-making process. One culture might respond particularly well to a prevention message focusing on the impact of an illness on the family. Another may be offended by an IHCS that emphasizes "I" messages often linked to a computer-based cognitive behavior therapy program. Properly designed, an implementation process matches users' learning styles to presentations that best meets their needs. To be maximally effective, however, an IHCS implementation plan should also build on the unique strengths of these populations taking into account the experience, knowledge, structures, and strategies that IHCS can enhance. At the same time the plan needs to be sensitive to the more limited resources available to the health care organizations serving these populations.

### *13.6.4. Creating an Infrastructure for Ongoing Improvement*

All systems should continue to improve after implementation, as should the processes for implementation. This is especially true of an IHCS where the field is still very much in an evolutionary mode and where appropriate roles and implementation strategies are still uncertain. Hence processes need to be put in place to review progress and set up mechanisms to insure that the IHCS and its implementation continue to improve with time.

In essence, this improvement process should be a subsystem of the implementation plan, with all of the characteristics listed above thought through. How should the purpose of the IHCS implementation be modified? How should expectations about results change? How should the changing needs of external customers be considered? How should the implementation methods change? How is the environment changing and how should that influence implementation? How should the roles of personnel change? How should data collection, analysis, and use change? How should the equipment and facilities change?

## Conclusion

Implementation of an IHCS is a complex, challenging process requiring the concerted attention of clinicians, information systems staff, managers, and patients. Successful implementation arises from characteristics of the innovation, the organization, and the manner in which the implementation process is carried out. A model for implementation can guide an institution on its journey toward twenty first century health care.

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# Appendix 13.1
# Readiness for Implementation Survey

The statements below describe different factors that may be present when a new technology **[the T]** is implemented.

**Organizational Environment.** Please check the boxes that best describe your organizational environment and add the values across all six questions. The summation will be between 0 and 6. Place that number in the box of Organizational Environment Factor Score.

1. Implementing unit's prior history of successful innovation:
___ Past history of failure $_0$
___ Mixed history of success and failure $_{0.5}$
___ No prior history $_{0.5}$
___ Past history of success $_1$

2. Leaders are:
___ Not innovative $_0$
___ Innovative $_1$

3. Internal turbulence (e.g., staffing and other organizational changes, etc.):
___ Hinders innovative projects $_0$
___ Not distracting to innovative projects $_1$

4. How well clinicians and support staff work as a team, in general:
___ Staff typically clash with each other $_0$
___ Staff typically don't work as a team $_{0.5}$
___ Staff typically work as a team $_1$

5. How cooperatively department works together, in general:
___ They typically clash$_0$
___ They typically don't work cooperatively$_{0.5}$
___ They typically are cooperative $_1$

6. Degree to which the healthcare environment (e.g., competition, reimbursement, etc.) encourages [the T]'s adoption by the organization:
___ Discourages adoption $_0$
___ Does not encourage adoption $_{0.5}$
___ Encourages adoption $_1$

**Organizational Environment Factor Score: _____**

**Organizational Motivation:** Please check the boxes that best describe your organizational motivation and add the values across all six questions. The summation will be between 0 and 6. Place that number in the box of Organizational Motivation Factor Score.

1. Degree to which [the T] meets important organizational and patient care goals:
___ It runs counter to goals $_0$

2. [The T] ability to solve a key problem:
___ Not immediately obvious$_0$
___ Immediately obvious $_1$

___ It doesn't impact goals$_{0.5}$
___ It helps to meet goals$_1$

3. Degree to which evidence shows [the T] saves the organization money:
___ Evidence [the T] costs money$_0$
___ Evidence [the T] breaks even$_{0.5}$
___ Evidence [the T] saves money $_1$

4. Degree that patients have expressed a need for services [the T] could provide:
___ Patients say they don't need/want the service$_0$
___ Patients have not expressed a need for the service$_{0.5}$
___ Patients have expressed a need for the service$_1$

5. Degree to which corporate administrators support the implementation of [the T]:
___ They actively create barriers$_0$
___ They take no strong position$_{0.5}$
___ They actively remove barriers$_1$

6. Enough staff and other resources are:
___ Inadequate$_0$
___ Adequate$_1$

**Organizational Motivation Factor Score: _____**

**Meeting User Needs:** Please check the boxes that best describe [the T's] ability to meet user needs and add the scores across all six questions. The summation will be between 0 and 6. Place that number in the box of Meeting User Needs Factor Score.

1. Regularity of updates:
___ Out of date$_0$
___ Regularly updated$_1$

2. Affordability:
___ Not affordable for patients$_0$
___ Affordable for patients$_1$

3. Convenience of access:
___ Inconvenient$_0$
___ Convenient$_1$

4. Ease for patients to find what they need:
___ Difficult$_0$
___ Easy$_1$

5. Technical help for users and staff:
___ Not readily available$_0$
___ Readily available$_1$

6. There is some indication that usage rates are:
___ Low$_0$
___ No information$_{0.5}$
___ High $_1$

**Meeting User Needs Factor Score:_____**

**Promotion:** Please check the boxes that best describe the promotion efforts involved in this implementation and add the values across all six questions. The summation will be between 0 and 6. Place that number in the box of Promotion Factor Score.

1. Promotion within the organization and to patients:
___ Little$_0$
___ Persistent$_1$

2. Corporate champion existence:
___ Do not exist$_0$
___ Push [the T] only initially$_{0.5}$
___ Push [the T] throughout the implementation $_1$

3. Corporate champion influence:
___ Not very influential$_0$
___ Influential$_1$

4. Department champion existence:
___ Do not exist$_0$
___ Push [the T] only initially $_{0.5}$
___ Push [the T] throughout the implementation $_1$

5. Department champion influence:
___ Not very influential$_0$
___ Influential$_1$

6. Regular progress reports:
___ Key persons do not receive reports$_0$
___ Key persons receive reports$_1$

**Promotion Factor Score:_____**

**Implementation:** Please check the boxes that best describe the implementation of [the T] and add the values across all six questions. The summation will be between 0 and 5. Place that number in the box of Implementation Factor Score.

1. [The T] in standard guidelines:
___ Not part of guidelines$_0$
___ Part of guidelines$_1$

2. Customizability:
___ Difficult$_0$
___ Easy$_1$

3. Processes to identify, refer, and support users:
___ Ineffective$_0$
___ Effective$_1$

4. Implementation role training for staff:
___ Not trained$_0$
___ Trained$_1$

5. Feedback is used to remove barriers and improve processes:
___ No$_0$
___ Yes$_1$

**Implementation Factor Score:_____**

**Fit in Department:** Please check the boxes that best describe [the T's] fit with the deparments it touches and add the values across all six questions. The summation will be between 0 and 7. Place that number in the box of Fit in Department Factor Score.

1. Home department:
___ None established$_0$
___ Not respected$_{0.5}$
___ Well respected $_1$

2. Implementation started in unit where:
___ Success is unlikely$_0$
___ Success is likely$_1$

3. Fit with other services/procedures:
___ Difficult$_0$
___ Easy$_1$

4. Technical difficulties:
___ Many$_0$
___ Few$_1$

5. Staff familiarity with the [the T]:

___ Unfamiliar$_0$
___ Familiar$_1$

6. Effect on staff workload:
___ Increases$_0$
___ Doesn't change$_{0.5}$
___ Decreases $_1$

7. Effect on care provider role:
____ Clinicians see it threatening$_0$
____ Clinicians do not see it threatening$_{0.5}$
____ Clinicians see it enhancing $_1$

**Fit in Department Factor Score:_____**

**Awareness and Support**: Please check the boxes that best describe your organizational motivation and add the values across all six questions. The summation will be between 0 and 6. Place that number in the box of Awareness and Support Factor Score.

1. Key opinion leader support of the [the T]:

___ Discourage use$_0$
___ Withhold judgment$_{0.5}$
___ Encourage use$_1$

2. Department manager support:

___ Create barriers$_0$
___ Take no strong position$_{0.5}$
___ Remove barriers $_1$

3. Key persons' understanding of implementation and use:
___ Do not understand$_0$
___ Understand$_1$

4. Clinicians see their patients are
___ Not affected by [the T]$_0$
___ Benefiting from [the T]$_1$

5. Clinician advice for patients:
___ Discourage use$_0$
___ Do not encourage use$_{0.5}$
___ Encourage use$_1$

6. Powerful skeptics:
___ Remain$_0$
___ Concerns are addressed$_1$

**Awareness and Support Factor Score: _____**

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