# THE OFFICIAL PATIENT'S SOURCEBOOK *on*

# PINWORM INFECTION

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# Dedication

To the healthcare professionals dedicating their time and efforts to the study of pinworm infection.

# Acknowledgements

The collective knowledge generated from academic and applied research summarized in various references has been critical in the creation of this sourcebook which is best viewed as a comprehensive compilation and collection of information prepared by various official agencies which directly or indirectly are dedicated to pinworm infection. All of the *Official Patient's Sourcebooks* draw from various agencies and institutions associated with the United States Department of Health and Human Services, and in particular, the Office of the Secretary of Health and Human Services (OS), the Administration for Children and Families (ACF), the Administration on Aging (AOA), the Agency for Healthcare Research and Quality (AHRQ), the Agency for Toxic Substances and Disease Registry (ATSDR), the Centers for Disease Control and Prevention (CDC), the Food and Drug Administration (FDA), the Healthcare Financing Administration (HCFA), the Health Resources and Services Administration (HRSA), the Indian Health Service (IHS), the institutions of the National Institutes of Health (NIH), the Program Support Center (PSC), and the Substance Abuse and Mental Health Services Administration (SAMHSA). In addition to these sources, information gathered from the National Library of Medicine, the United States Patent Office, the European Union, and their related organizations has been invaluable in the creation of this sourcebook. Some of the work represented was financially supported by the Research and Development Committee at INSEAD. This support is gratefully acknowledged. Finally, special thanks are owed to Tiffany LaRochelle for her excellent editorial support.

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# About ICON Health Publications

In addition to pinworm infection, *Official Patient's Sourcebooks* are available for the following related topics:

- The Official Patient's Sourcebook on Acanthamoeba Infection
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- The Official Patient's Sourcebook on Amebiasis
- The Official Patient's Sourcebook on Angiostrongylus Cantonensis
- The Official Patient's Sourcebook on Anisakiasis
- The Official Patient's Sourcebook on Ascaris Infection
- The Official Patient's Sourcebook on Babesia Infection
- The Official Patient's Sourcebook on Balantidiasis
- The Official Patient's Sourcebook on Baylisascaris
- The Official Patient's Sourcebook on Blastocystis Hominis
- The Official Patient's Sourcebook on Body Lice
- The Official Patient's Sourcebook on Capillaria Infection
- The Official Patient's Sourcebook on Chagas Disease
- The Official Patient's Sourcebook on Chronic Diarrhea
- The Official Patient's Sourcebook on Clonorchiasis
- The Official Patient's Sourcebook on Cryptosporidium
- The Official Patient's Sourcebook on Cysticercosis
- The Official Patient's Sourcebook on Dientamoeba Fragilis
- The Official Patient's Sourcebook on Diphyllobothrium Infection
- The Official Patient's Sourcebook on Dipylidium Infection
- The Official Patient's Sourcebook on Dracunculiasis
- The Official Patient's Sourcebook on East African Trypanosomiasis
- The Official Patient's Sourcebook on Fasciola Infection
- The Official Patient's Sourcebook on Fasciolopsiasis
- The Official Patient's Sourcebook on Giardiasis
- The Official Patient's Sourcebook on Gnathostoma Infection
- The Official Patient's Sourcebook on Head Lice
- The Official Patient's Sourcebook on Heterophyes Infection
- The Official Patient's Sourcebook on Hookworm
- The Official Patient's Sourcebook on Hymenloepis Infection
- The Official Patient's Sourcebook on Infection with Nonpathogenic Intestinal Amebas
- The Official Patient's Sourcebook on Isospora Belli
- The Official Patient's Sourcebook on Leishmaniasis
- The Official Patient's Sourcebook on Lymphatic Filariasis

- The Official Patient's Sourcebook on Microsporidiosis
- The Official Patient's Sourcebook on Naegleria
- The Official Patient's Sourcebook on Opisthorchis
- The Official Patient's Sourcebook on Paragonimus
- The Official Patient's Sourcebook on Pneumocystis Carinii
- The Official Patient's Sourcebook on Pubic Lice
- The Official Patient's Sourcebook on Scabies
- The Official Patient's Sourcebook on Schistosomiasis
- The Official Patient's Sourcebook on Strongyloides
- The Official Patient's Sourcebook on Swimmer's Itch
- The Official Patient's Sourcebook on Taenia Saginata
- The Official Patient's Sourcebook on Toxocariasis
- The Official Patient's Sourcebook on Toxoplasmosis
- The Official Patient's Sourcebook on Trichinosis
- The Official Patient's Sourcebook on Trichomonas Infection
- The Official Patient's Sourcebook on Trichuris Trichiura
- The Official Patient's Sourcebook on West African Trypanosomiasis

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# INTRODUCTION

## Overview

Dr. C. Everett Koop, former U.S. Surgeon General, once said, "The best prescription is knowledge."[1] The Agency for Healthcare Research and Quality (AHRQ) of the National Institutes of Health (NIH) echoes this view and recommends that every patient incorporate education into the treatment process. According to the AHRQ:

> Finding out more about your condition is a good place to start. By contacting groups that support your condition, visiting your local library, and searching on the Internet, you can find good information to help guide your treatment decisions. Some information may be hard to find—especially if you don't know where to look.[2]

As the AHRQ mentions, finding the right information is not an obvious task. Though many physicians and public officials had thought that the emergence of the Internet would do much to assist patients in obtaining reliable information, in March 2001 the National Institutes of Health issued the following warning:

> The number of Web sites offering health-related resources grows every day. Many sites provide valuable information, while others may have information that is unreliable or misleading.[3]

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[1] Quotation from **http://www.drkoop.com**.
[2] The Agency for Healthcare Research and Quality (AHRQ): **http://www.ahcpr.gov/consumer/diaginfo.htm**.
[3] From the NIH, National Cancer Institute (NCI): **http://cancertrials.nci.nih.gov/beyond/evaluating.html**.

Since the late 1990s, physicians have seen a general increase in patient Internet usage rates. Patients frequently enter their doctor's offices with printed Web pages of home remedies in the guise of latest medical research. This scenario is so common that doctors often spend more time dispelling misleading information than guiding patients through sound therapies. *The Official Patient's Sourcebook on Pinworm Infection* has been created for patients who have decided to make education and research an integral part of the treatment process. The pages that follow will tell you where and how to look for information covering virtually all topics related to pinworm infection, from the essentials to the most advanced areas of research.

The title of this book includes the word "official." This reflects the fact that the sourcebook draws from public, academic, government, and peer-reviewed research. Selected readings from various agencies are reproduced to give you some of the latest official information available to date on pinworm infection.

Given patients' increasing sophistication in using the Internet, abundant references to reliable Internet-based resources are provided throughout this sourcebook. Where possible, guidance is provided on how to obtain free-of-charge, primary research results as well as more detailed information via the Internet. E-book and electronic versions of this sourcebook are fully interactive with each of the Internet sites mentioned (clicking on a hyperlink automatically opens your browser to the site indicated). Hard copy users of this sourcebook can type cited Web addresses directly into their browsers to obtain access to the corresponding sites. Since we are working with ICON Health Publications, hard copy *Sourcebooks* are frequently updated and printed on demand to ensure that the information provided is current.

In addition to extensive references accessible via the Internet, every chapter presents a "Vocabulary Builder." Many health guides offer glossaries of technical or uncommon terms in an appendix. In editing this sourcebook, we have decided to place a smaller glossary within each chapter that covers terms used in that chapter. Given the technical nature of some chapters, you may need to revisit many sections. Building one's vocabulary of medical terms in such a gradual manner has been shown to improve the learning process.

We must emphasize that no sourcebook on pinworm infection should affirm that a specific diagnostic procedure or treatment discussed in a research study, patent, or doctoral dissertation is "correct" or your best option. This sourcebook is no exception. Each patient is unique. Deciding on appropriate

options is always up to the patient in consultation with their physician and healthcare providers.

## Organization

This sourcebook is organized into three parts. Part I explores basic techniques to researching pinworm infection (e.g. finding guidelines on diagnosis, treatments, and prognosis), followed by a number of topics, including information on how to get in touch with organizations, associations, or other patient networks dedicated to pinworm infection. It also gives you sources of information that can help you find a doctor in your local area specializing in treating pinworm infection. Collectively, the material presented in Part I is a complete primer on basic research topics for patients with pinworm infection.

Part II moves on to advanced research dedicated to pinworm infection. Part II is intended for those willing to invest many hours of hard work and study. It is here that we direct you to the latest scientific and applied research on pinworm infection. When possible, contact names, links via the Internet, and summaries are provided. It is in Part II where the vocabulary process becomes important as authors publishing advanced research frequently use highly specialized language. In general, every attempt is made to recommend "free-to-use" options.

Part III provides appendices of useful background reading for all patients with pinworm infection or related disorders. The appendices are dedicated to more pragmatic issues faced by many patients with pinworm infection. Accessing materials via medical libraries may be the only option for some readers, so a guide is provided for finding local medical libraries which are open to the public. Part III, therefore, focuses on advice that goes beyond the biological and scientific issues facing patients with pinworm infection.

## Scope

While this sourcebook covers pinworm infection, your doctor, research publications, and specialists may refer to your condition using a variety of terms. Therefore, you should understand that pinworm infection is often considered a synonym or a condition closely related to the following:

- Enterobiasis
- Enterobiasis Enterobius Vermicularis

- Oxyuriasis
- Pinworm Infection
- Seatworm
- Threadworm

In addition to synonyms and related conditions, physicians may refer to pinworm infection using certain coding systems. The International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) is the most commonly used system of classification for the world's illnesses. Your physician may use this coding system as an administrative or tracking tool. The following classification is commonly used for pinworm infection:[4]

- 127.4 enterobiasis

For the purposes of this sourcebook, we have attempted to be as inclusive as possible, looking for official information for all of the synonyms relevant to pinworm infection. You may find it useful to refer to synonyms when accessing databases or interacting with healthcare professionals and medical librarians.

## Moving Forward

Since the 1980s, the world has seen a proliferation of healthcare guides covering most illnesses. Some are written by patients or their family members. These generally take a layperson's approach to understanding and coping with an illness or disorder. They can be uplifting, encouraging, and highly supportive. Other guides are authored by physicians or other healthcare providers who have a more clinical outlook. Each of these two styles of guide has its purpose and can be quite useful.

As editors, we have chosen a third route. We have chosen to expose you to as many sources of official and peer-reviewed information as practical, for the purpose of educating you about basic and advanced knowledge as recognized by medical science today. You can think of this sourcebook as your personal Internet age reference librarian.

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[4] This list is based on the official version of the World Health Organization's 9th Revision, International Classification of Diseases (ICD-9). According to the National Technical Information Service, "ICD-9CM extensions, interpretations, modifications, addenda, or errata other than those approved by the U.S. Public Health Service and the Health Care Financing Administration are not to be considered official and should not be utilized. Continuous maintenance of the ICD-9-CM is the responsibility of the federal government."

Why "Internet age"? All too often, patients diagnosed with pinworm infection will log on to the Internet, type words into a search engine, and receive several Web site listings which are mostly irrelevant or redundant. These patients are left to wonder where the relevant information is, and how to obtain it. Since only the smallest fraction of information dealing with pinworm infection is even indexed in search engines, a non-systematic approach often leads to frustration and disappointment. With this sourcebook, we hope to direct you to the information you need that you would not likely find using popular Web directories. Beyond Web listings, in many cases we will reproduce brief summaries or abstracts of available reference materials. These abstracts often contain distilled information on topics of discussion.

Before beginning your search for information, it is important for you to realize that pinworm infection is considered a relatively uncommon condition. Because of this, far less research is conducted on pinworm infection compared to other health problems afflicting larger populations, like breast cancer or heart disease. Nevertheless, this sourcebook will prove useful for two reasons. First, if more information does become available on pinworm infection, the sources given in this book will be the most likely to report or make such information available. Second, some will find it important to know about patient support, symptom management, or diagnostic procedures that may be relevant to both pinworm infection and other conditions. By using the sources listed in the following chapters, self-directed research can be conducted on broader topics that are related to pinworm infection but not readily uncovered using general Internet search engines (e.g. www.google.com or www.yahoo.com). In this way, we have designed this sourcebook to complement these general search engines that can provide useful information and access to online patient support groups.[5]

[5] For example, one can simply go to **www.google.com,** or other general search engines (e.g. **www.yahoo.com**, **www.aol.com**, **www.msn.com**) and type in "pinworm infection support group" to find any active online support groups dedicated to pinworm infection.

While we focus on the more scientific aspects of pinworm infection, there is, of course, the emotional side to consider. Later in the sourcebook, we provide a chapter dedicated to helping you find peer groups and associations that can provide additional support beyond research produced by medical science. We hope that the choices we have made give you the most options available in moving forward. In this way, we wish you the best in your efforts to incorporate this educational approach into your treatment plan.

*The Editors*

# PART I: THE ESSENTIALS

## ABOUT PART I

Part I has been edited to give you access to what we feel are "the essentials" on pinworm infection. The essentials of a disease typically include the definition or description of the disease, a discussion of who it affects, the signs or symptoms associated with the disease, tests or diagnostic procedures that might be specific to the disease, and treatments for the disease. Your doctor or healthcare provider may have already explained the essentials of pinworm infection to you or even given you a pamphlet or brochure describing pinworm infection. Now you are searching for more in-depth information. As editors, we have decided, nevertheless, to include a discussion on where to find essential information that can complement what your doctor has already told you. In this section we recommend a process, not a particular Web site or reference book. The process ensures that, as you search the Web, you gain background information in such a way as to maximize your understanding.

# CHAPTER 1. THE ESSENTIALS ON PINWORM INFECTION: GUIDELINES

## Overview

Official agencies, as well as federally-funded institutions supported by national grants, frequently publish a variety of guidelines on pinworm infection. These are typically called "Fact Sheets" or "Guidelines." They can take the form of a brochure, information kit, pamphlet, or flyer. Often they are only a few pages in length. The great advantage of guidelines over other sources is that they are often written with the patient in mind. Since new guidelines on pinworm infection can appear at any moment and be published by a number of sources, the best approach to finding guidelines is to systematically scan the Internet-based services that post them.

### The National Institutes of Health (NIH)[6]

The National Institutes of Health (NIH) is the first place to search for relatively current patient guidelines and fact sheets on pinworm infection. Originally founded in 1887, the NIH is one of the world's foremost medical research centers and the federal focal point for medical research in the United States. At any given time, the NIH supports some 35,000 research grants at universities, medical schools, and other research and training institutions, both nationally and internationally. The rosters of those who have conducted research or who have received NIH support over the years include the world's most illustrious scientists and physicians. Among them are 97 scientists who have won the Nobel Prize for achievement in medicine.

[6] Adapted from the NIH: **http://www.nih.gov/about/NIHoverview.html**.

There is no guarantee that any one Institute will have a guideline on a specific disease, though the National Institutes of Health collectively publish over 600 guidelines for both common and rare diseases. The best way to access NIH guidelines is via the Internet. Although the NIH is organized into many different Institutes and Offices, the following is a list of key Web sites where you are most likely to find NIH clinical guidelines and publications dealing with pinworm infection and associated conditions:

- Office of the Director (OD); guidelines consolidated across agencies available at **http://www.nih.gov/health/consumer/conkey.htm**
- National Library of Medicine (NLM); extensive encyclopedia (A.D.A.M., Inc.) with guidelines available at **http://www.nlm.nih.gov/medlineplus/healthtopics.html**
- National Institute of Allergy and Infectious Diseases (NIAID); guidelines available at **http://www.niaid.nih.gov/publications/**
- Centers for Disease Control and Prevention: various fact sheets on infectious diseases at **http://www.cdc.gov/health/diseases.htm**

Among the above, the National Institute of Allergy and Infectious Diseases (NIAID) is particularly noteworthy. The mission of the NIAID is to provide support for scientists conducting research aimed at developing better ways to diagnose, treat, and prevent the many infectious, immunologic and allergic diseases that afflict people worldwide.[7] The NIAID is composed of four extramural divisions: the Division of AIDS; the Division of Allergy, Immunology and Transplantation; the Division of Microbiology and Infectious Diseases; and the Division of Extramural Activities. In addition, NIAID scientists conduct intramural research in laboratories located in Bethesda, Rockville and Frederick, Maryland, and in Hamilton, Montana. The following patient guideline was recently published by the NIAID on pinworm infection.

## What Is Pinworm Infection?[8]

This infection is caused by a small, white intestinal worm called Enterobius vermicularis (EN-ter-O-be-us ver-MIK-u-lar-is). Pinworms are about the length of a staple and live in the rectum of humans. While an infected person

[7] This paragraph has been adapted from the NIAID: **http://www.niaid.nih.gov/facts/overview.htm**. "Adapted" signifies that a passage has been reproduced exactly or slightly edited for this book.
[8] Adapted from The Centers of Disease Control and Prevention (CDC): **http://www.cdc.gov/ncidod/dpd/parasites/pinworm/factsht_pinworm.htm**.

sleeps, female pinworms leave the intestines through the anus and deposit eggs on the surrounding skin.

## What Are the Symptoms of a Pinworm Infection?

Itching around the anus, disturbed sleep, and irritability are common symptoms. If the infection is heavy, symptoms may also include loss of appetite, restlessness, and difficulty sleeping. Symptoms are caused by the female pinworm laying her eggs. Most symptoms of pinworm infection are mild; many infected people have no symptoms.

## Who Is at Risk for Pinworm Infection?

Pinworm is the most common worm infection in the United States. School-age children, followed by preschoolers, have the highest rates of infection. In some groups nearly 50% of children are infected. Infection often occurs in more than one family member. Adults are less likely to have pinworm infection, except mothers of infected children. Child care centers, and other institutional settings often have cases of pinworm infection.

## How Is Pinworm Infection Spread?

Pinworm eggs are infective within a few hours after being deposited on the skin. They can survive up to 2 weeks on clothing, bedding, or other objects. You or your children can become infected after accidentally ingesting (swallowing) infective pinworm eggs from contaminated surfaces or fingers.

## How Is Pinworm Infection Diagnosed?

If pinworms are suspected, transparent adhesive tape (often called the "scotch tape test") or a pinworm paddle (supplied by your health care provider) are applied to the anal region. The eggs become glued to the sticky tape or paddle and are identified by examination under a microscope. Because bathing or having a bowel movement may remove eggs, the test should be done as soon as you wake up in the morning. You may have to provide several samples to your health care provider for examination. Since scratching of the anal area is common, samples taken from under the

fingernails may also contain eggs. Eggs are rarely found during lab examinations of stool or urine. At night, the adult worms can sometimes be seen directly in bedclothes or around the anal area.

## How Is Pinworm Infection Treated?

With either prescription or over-the-counter drugs. You should consult your health care provider before treating a suspected case of pinworm. Treatment involves a two-dose course. The second dose should be given 2 weeks after the first.

## What If the Pinworm Infection Occurs Again?

The infected person should be treated with the same two-dose treatment. Close family contacts should also be treated. If the infection occurs again, you should search for the source of the infection. Playmates, schoolmates, close contacts outside the house, and household members should be considered. Each infected person should receive the usual two-dose treatment. In some cases it may be necessary to treat with more than two doses. One option is four to six treatments spaced 2 weeks apart.

## How Can I Prevent the Spread of Infection and Re-infection?

- Bathe when you wake up to help reduce the egg contamination.
- Change and wash your underwear each day. Frequent changing of night clothes are recommended.
- Change underwear, night clothes, and sheets after each treatment. Because the eggs are sensitive to sunlight, open blinds or curtains in bedrooms during the day.
- Personal hygiene should include washing hands after going to the toilet, before eating and after changing diapers.
- Trim fingernails short.
- Discourage nail-biting and scratching bare anal areas. These practices help reduce the risk of continuous self reinfection.
- Cleaning and vacuuming the entire house or washing sheets every day are probably not necessary or effective. Screening for pinworm infection

in schools or institutions is rarely recommended. Children may return to day care after the first treatment dose, after bathing, and after trimming and scrubbing nails.

## Pinworm Infection: Technical Notes

DPDx is a Web site developed and maintained by CDC's Division of Parasitic Diseases (DPD). Their goal is to use the Internet to strengthen diagnosis of parasitic diseases, both in the United States and abroad. For that purpose, DPDx offers two complementary functions: (1) a reference and training function, in which all users can browse through concise reviews of parasites and parasitic diseases, including an image library and a review of recommended procedures for collecting, shipping, processing, and examining biologic specimens, and (2) a diagnostic assistance function, in which laboratorians and other health professionals desiring assistance in parasite identification can ask questions and/or send digital images of specimens for expedited review and consultation with DPD staff. The review below is adapted from a DPDx review of pinworm infection.[9] As the information was prepared for healthcare professionals, some of the language is technical. Relevant terms are defined in the vocabulary builder at the end of this chapter.

## Causal Agent

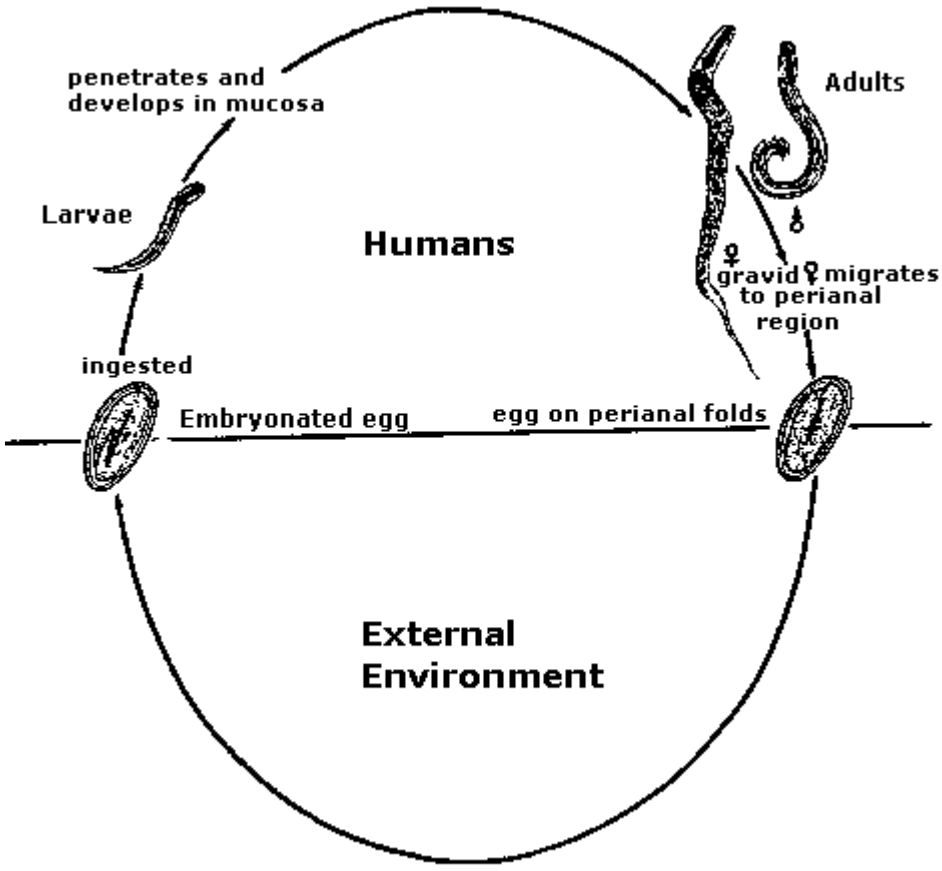
The nematode (roundworm) Enterobius vermicularis (previously Oxyuris vermicularis) also called human pinworm. (Adult females: 8 to 13 mm, adult male: 2 to 5 mm.) Humans are practically the only hosts of E. vermicularis.

## Life Cycle

Adult worms live in the lumen of the human colon. Gravid females migrate nocturnally outside the anus and oviposit while crawling on the skin of the

[9] This paragraph has been adapted from the DPDx: **http://www.dpd.cdc.gov/dpdx/HTML/Enterobiasis.htm**. The review of pinworm infection has been adapted from the DPDx Web site. Further treatment information in The Medical Letter (**http://www.medletter.com/**) is recommended in the DPDx. The section of "Diagnostic Findings" which provides diagnostic images and related information should be viewed separately at: **http://www.dpd.cdc.gov/dpdx/HTML/Frames/A-F/Enterobiasis/body_Enterobiasis_mic1.htm**.

perianal area. The larvae contained inside the eggs develop (the eggs become infective) in 4 hours under optimal conditions. Self-infection occurs by transferring infective eggs to the mouth with hands that have scratched the perianal area. Person-to-person transmission can also occur through handling of contaminated clothes or bed linens. Following ingestion of infective eggs, the larvae hatch in the small intestine and the adults establish themselves in the colon. The time interval from ingestion of infective eggs to oviposition by the adult females is about one month. The life span of the adults is about two months.




## Geographic Distribution

Worldwide, with infections more frequent in school- or preschool- children and in crowded conditions. The most common helminthic infection in the United States (an estimated 40 million persons infected).

## Clinical Features

Enterobiasis is frequently asymptomatic. The most typical symptom is perianal pruritus, especially at night, which may lead to excoriations and bacterial superinfection. Occasionally, invasion of the female genital tract with vulvovaginitis and pelvic or peritoneal granulomas can occur. Other symptoms include anorexia, irritability, and abdominal pain.

## Laboratory Diagnosis

Microscopic identification of eggs collected in the perianal area is the method of choice for diagnosing enterobiasis. This must be done in the morning, before defecation and washing, by pressing transparent adhesive tape ("Scotch test", cellulose-tape slide test) on the perianal skin and then examining the tape placed on a slide. Alternatively, anal swabs or "Swube tubes" (a paddle coated with adhesive material) can also be used. Eggs can also be found, but less frequently, in the stool, and occasionally are encountered in the urine or vaginal smears. Adult worms are also diagnostic, when found in the perianal area, or during ano-rectal or vaginal examinations.

## Treatment

The drug of choice is pyrantel pamoate. Measures to prevent re-infection, such as personal hygiene and laundering of bedding, should be discussed and implemented in cases where infection affects other household members.

## More Guideline Sources

The guideline above on pinworm infection is only one example of the kind of material that you can find online and free of charge. The remainder of this chapter will direct you to other sources which either publish or can help you find additional guidelines on topics related to pinworm infection. Many of the guidelines listed below address topics that may be of particular relevance to your specific situation or of special interest to only some patients with pinworm infection. Due to space limitations these sources are listed in a concise manner. Do not hesitate to consult the following sources by either

using the Internet hyperlink provided, or, in cases where the contact information is provided, contacting the publisher or author directly.

### Topic Pages: MEDLINEplus

For patients wishing to go beyond guidelines published by specific Institutes of the NIH, the National Library of Medicine has created a vast and patient-oriented healthcare information portal called MEDLINEplus. Within this Internet-based system are "health topic pages." You can think of a health topic page as a guide to patient guides. To access this system, log on to **http://www.nlm.nih.gov/medlineplus/healthtopics.html**. From there you can either search using the alphabetical index or browse by broad topic areas.

If you do not find topics of interest when browsing health topic pages, then you can choose to use the advanced search utility of MEDLINEplus at **http://www.nlm.nih.gov/medlineplus/advancedsearch.html**. This utility is similar to the NIH Search Utility, with the exception that it only includes material linked within the MEDLINEplus system (mostly patient-oriented information). It also has the disadvantage of generating unstructured results. We recommend, therefore, that you use this method only if you have a very targeted search.

### Healthfinder™

Healthfinder™ is an additional source sponsored by the U.S. Department of Health and Human Services which offers links to hundreds of other sites that contain healthcare information. This Web site is located at **http://www.healthfinder.gov**. Again, keyword searches can be used to find guidelines. The following was recently found in this database:

- **Antibiotics: Information for Patients**

  Summary: This site contains important facts for patients and their families about antibiotics including facts about antibiotic resistance and advice on taking antibiotics and reducing bacterial infections.

  Source: Alliance for the Prudent Use of Antibiotics

  http://www.healthfinder.gov/scripts/recordpass.asp?RecordType=0&RecordID=2846

### The NIH Search Utility

After browsing the references listed at the beginning of this chapter, you may want to explore the NIH Search Utility. This allows you to search for documents on over 100 selected Web sites that comprise the NIH-WEB-SPACE. Each of these servers is "crawled" and indexed on an ongoing basis. Your search will produce a list of various documents, all of which will relate in some way to pinworm infection. The drawbacks of this approach are that the information is not organized by theme and that the references are often a mix of information for professionals and patients. Nevertheless, a large number of the listed Web sites provide useful background information. We can only recommend this route, therefore, for relatively rare or specific disorders, or when using highly targeted searches. To use the NIH search utility, visit the following Web page: **http://search.nih.gov/index.html**.

### Additional Web Sources

A number of Web sites that often link to government sites are available to the public. These can also point you in the direction of essential information. The following is a representative sample:

- AOL: **http://search.aol.com/cat.adp?id=168&layer=&from=subcats**
- drkoop.com®: **http://www.drkoop.com/conditions/ency/index.html**
- Family Village: **http://www.familyvillage.wisc.edu/specific.htm**
- Google: **http://directory.google.com/Top/Health/Conditions_and_Diseases/**
- Med Help International: **http://www.medhelp.org/HealthTopics/A.html**
- Open Directory Project: **http://dmoz.org/Health/Conditions_and_Diseases/**
- Yahoo.com: **http://dir.yahoo.com/Health/Diseases_and_Conditions/**
- WebMD®Health: **http://my.webmd.com/health_topics**

## Vocabulary Builder

The material in this chapter may have contained a number of unfamiliar words. The following Vocabulary Builder introduces you to terms used in this chapter that have not been covered in the previous chapter:

**Anal:** Pertaining to the anus. [EU]

**Anorexia:** Lack or loss of the appetite for food. [EU]

**Anus:** The distal or terminal orifice of the alimentary canal. [EU]

**Asymptomatic:** Showing or causing no symptoms. [EU]

**Causal:** Pertaining to a cause; directed against a cause. [EU]

**Cellulose:** A polysaccharide with glucose units linked as in cellobiose. It is the chief constituent of plant fibers, cotton being the purest natural form of the substance. As a raw material, it forms the basis for many derivatives used in chromatography, ion exchange materials, explosives manufacturing, and pharmaceutical preparations. [NIH]

**Contamination:** The soiling or pollution by inferior material, as by the introduction of organisms into a wound, or sewage into a stream. [EU]

**Defecation:** The normal process of elimination of fecal material from the rectum. [NIH]

**Enterobiasis:** Infection with nematodes of the genus enterobius. E. vermicularis, the pinworm of man, causes a crawling sensation and pruritus. This condition results in scratching the area, occasionally causing scarification. [NIH]

**Enterobius:** A genus of intestinal nematode worms which includes the pinworm or threadworm Enterobius vermicularis. [NIH]

**Genital:** Pertaining to the genitalia. [EU]

**Granuloma:** A relatively small nodular inflammatory lesion containing grouped mononuclear phagocytes, caused by infectious and noninfectious agents. [NIH]

**Ingestion:** The act of taking food, medicines, etc., into the body, by mouth. [EU]

**Intestinal:** Pertaining to the intestine. [EU]

**Intestines:** The section of the alimentary canal from the stomach to the anus. It includes the large intestine and small intestine. [NIH]

**Lumen:** The cavity or channel within a tube or tubular organ. [EU]

**Microbiology:** The study of microorganisms such as fungi, bacteria, algae, archaea, and viruses. [NIH]

**Parasitic:** Pertaining to, of the nature of, or caused by a parasite. [EU]

**Perianal:** Located around the anus. [EU]

**Pruritus:** 1. itching; an unpleasant cutaneous sensation that provokes the desire to rub or scratch the skin to obtain relief. 2. any of various conditions marked by itching, the specific site or type being indicated by a modifying term. [EU]

**Rectal:** Pertaining to the rectum (= distal portion of the large intestine). [EU]

**Reinfection:** A second infection by the same pathogenic agent, or a second infection of an organ such as the kidney by a different pathogenic agent. [EU]

**Superinfection:** A new infection complicating the course of antimicrobial therapy of an existing infectious process, and resulting from invasion by bacteria or fungi resistant to the drug(s) in use. It may occur at the site of the original infection or at a remote site. [EU]

**Transplantation:** The grafting of tissues taken from the patient's own body or from another. [EU]

**Urinary:** Pertaining to the urine; containing or secreting urine. [EU]

**Vaginal:** 1. of the nature of a sheath; ensheathing. 2. pertaining to the vagina. 3. pertaining to the tunica vaginalis testis. [EU]

**Venereal:** Pertaining or related to or transmitted by sexual contact. [EU]

**Vulvovaginitis:** Inflammation of the vulva and vagina, or of the vulvovaginal glands. [EU]

**Warts:** Benign epidermal proliferations or tumors; some are viral in origin. [NIH]

# CHAPTER 2. SEEKING GUIDANCE

## Overview

Some patients are comforted by the knowledge that a number of organizations dedicate their resources to helping people with pinworm infection. These associations can become invaluable sources of information and advice. Many associations offer aftercare support, financial assistance, and other important services. Furthermore, healthcare research has shown that support groups often help people to better cope with their conditions.[10] In addition to support groups, your physician can be a valuable source of guidance and support. Therefore, finding a physician that can work with your unique situation is a very important aspect of your care.

In this chapter, we direct you to resources that can help you find patient organizations and medical specialists. We begin by describing how to find associations and peer groups that can help you better understand and cope with pinworm infection. The chapter ends with a discussion on how to find a doctor that is right for you.

## Associations and Pinworm Infection

As mentioned by the Agency for Healthcare Research and Quality, sometimes the emotional side of an illness can be as taxing as the physical side.[11] You may have fears or feel overwhelmed by your situation. Everyone has different ways of dealing with disease or physical injury. Your attitude, your expectations, and how well you cope with your condition can all

[10] Churches, synagogues, and other houses of worship might also have groups that can offer you the social support you need.
[11] This section has been adapted from **http://www.ahcpr.gov/consumer/diaginf5.htm**.

influence your well-being. This is true for both minor conditions and serious illnesses. For example, a study on female breast cancer survivors revealed that women who participated in support groups lived longer and experienced better quality of life when compared with women who did not participate. In the support group, women learned coping skills and had the opportunity to share their feelings with other women in the same situation.
There are a number of directories that list additional medical associations that you may find useful. While not all of these directories will provide different information, by consulting all of them, you will have nearly exhausted all sources for patient associations.

### The National Health Information Center (NHIC)

The National Health Information Center (NHIC) offers a free referral service to help people find organizations that provide information about pinworm infection. For more information, see the NHIC's Web site at **http://www.health.gov/NHIC/** or contact an information specialist by calling 1-800-336-4797.

### DIRLINE

A comprehensive source of information on associations is the DIRLINE database maintained by the National Library of Medicine. The database comprises some 10,000 records of organizations, research centers, and government institutes and associations which primarily focus on health and biomedicine. DIRLINE is available via the Internet at the following Web site: **http://dirline.nlm.nih.gov/**. Simply type in "pinworm infection" (or a synonym) or the name of a topic, and the site will list information contained in the database on all relevant organizations.

### The Combined Health Information Database

Another comprehensive source of information on healthcare associations is the Combined Health Information Database. Using the "Detailed Search" option, you will need to limit your search to "Organizations" and "pinworm infection". Type the following hyperlink into your Web browser: **http://chid.nih.gov/detail/detail.html**. To find associations, use the drop boxes at the bottom of the search page where "You may refine your search by." For publication date, select "All Years." Then, select your preferred language and the format option "Organization Resource Sheet." By making

these selections and typing in "pinworm infection" (or synonyms) into the "For these words:" box, you will only receive results on organizations dealing with pinworm infection. You should check back periodically with this database since it is updated every 3 months.

### The National Organization for Rare Disorders, Inc.

The National Organization for Rare Disorders, Inc. has prepared a Web site that provides, at no charge, lists of associations organized by specific diseases. You can access this database at the following Web site: **http://www.rarediseases.org/cgi-bin/nord/searchpage**. Select the option called "Organizational Database (ODB)" and type "pinworm infection" (or a synonym) in the search box.

### Online Support Groups

In addition to support groups, commercial Internet service providers offer forums and chat rooms for people with different illnesses and conditions. WebMD®, for example, offers such a service at their Web site: **http://boards.webmd.com/roundtable**. These online self-help communities can help you connect with a network of people whose concerns are similar to yours. Online support groups are places where people can talk informally. If you read about a novel approach, consult with your doctor or other healthcare providers, as the treatments or discoveries you hear about may not be scientifically proven to be safe and effective.

## Finding Doctors

One of the most important aspects of your treatment will be the relationship between you and your doctor or specialist. All patients with pinworm infection must go through the process of selecting a physician. While this process will vary from person to person, the Agency for Healthcare Research and Quality makes a number of suggestions, including the following:[12]

- If you are in a managed care plan, check the plan's list of doctors first.
- Ask doctors or other health professionals who work with doctors, such as hospital nurses, for referrals.

[12] This section is adapted from the AHRQ: **www.ahrq.gov/consumer/qntascii/qntdr.htm**.

- Call a hospital's doctor referral service, but keep in mind that these services usually refer you to doctors on staff at that particular hospital. The services do not have information on the quality of care that these doctors provide.
- Some local medical societies offer lists of member doctors. Again, these lists do not have information on the quality of care that these doctors provide.

Additional steps you can take to locate doctors include the following:

- Check with the associations listed earlier in this chapter.
- Information on doctors in some states is available on the Internet at **http://www.docboard.org**. This Web site is run by "Administrators in Medicine," a group of state medical board directors.
- The American Board of Medical Specialties can tell you if your doctor is board certified. "Certified" means that the doctor has completed a training program in a specialty and has passed an exam, or "board," to assess his or her knowledge, skills, and experience to provide quality patient care in that specialty. Primary care doctors may also be certified as specialists. The AMBS Web site is located at **http://www.abms.org/newsearch.asp**.[13] You can also contact the ABMS by phone at 1-866-ASK-ABMS.
- You can call the American Medical Association (AMA) at 800-665-2882 for information on training, specialties, and board certification for many licensed doctors in the United States. This information also can be found in "Physician Select" at the AMA's Web site: **http://www.ama-assn.org/aps/amahg.htm**.

If the previous sources did not meet your needs, you may want to log on to the Web site of the National Organization for Rare Disorders (NORD) at **http://www.rarediseases.org/**. NORD maintains a database of doctors with expertise in various rare diseases. The Metabolic Information Network (MIN), 800-945-2188, also maintains a database of physicians with expertise in various metabolic diseases.

[13] While board certification is a good measure of a doctor's knowledge, it is possible to receive quality care from doctors who are not board certified.

## Selecting Your Doctor[14]

When you have compiled a list of prospective doctors, call each of their offices. First, ask if the doctor accepts your health insurance plan and if he or she is taking new patients. If the doctor is not covered by your plan, ask yourself if you are prepared to pay the extra costs. The next step is to schedule a visit with your chosen physician. During the first visit you will have the opportunity to evaluate your doctor and to find out if you feel comfortable with him or her. Ask yourself, did the doctor:

- Give me a chance to ask questions about pinworm infection?
- Really listen to my questions?
- Answer in terms I understood?
- Show respect for me?
- Ask me questions?
- Make me feel comfortable?
- Address the health problem(s) I came with?
- Ask me my preferences about different kinds of treatments for pinworm infection?
- Spend enough time with me?

Trust your instincts when deciding if the doctor is right for you. But remember, it might take time for the relationship to develop. It takes more than one visit for you and your doctor to get to know each other.

## Working with Your Doctor[15]

Research has shown that patients who have good relationships with their doctors tend to be more satisfied with their care and have better results. Here are some tips to help you and your doctor become partners:

- You know important things about your symptoms and your health history. Tell your doctor what you think he or she needs to know.
- It is important to tell your doctor personal information, even if it makes you feel embarrassed or uncomfortable.

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[14] This section has been adapted from the AHRQ: **www.ahrq.gov/consumer/qntascii/qntdr.htm**.
[15] This section has been adapted from the AHRQ: **www.ahrq.gov/consumer/qntascii/qntdr.htm**.

- Bring a "health history" list with you (and keep it up to date).
- Always bring any medications you are currently taking with you to the appointment, or you can bring a list of your medications including dosage and frequency information. Talk about any allergies or reactions you have had to your medications.
- Tell your doctor about any natural or alternative medicines you are taking.
- Bring other medical information, such as x-ray films, test results, and medical records.
- Ask questions. If you don't, your doctor will assume that you understood everything that was said.
- Write down your questions before your visit. List the most important ones first to make sure that they are addressed.
- Consider bringing a friend with you to the appointment to help you ask questions. This person can also help you understand and/or remember the answers.
- Ask your doctor to draw pictures if you think that this would help you understand.
- Take notes. Some doctors do not mind if you bring a tape recorder to help you remember things, but always ask first.
- Let your doctor know if you need more time. If there is not time that day, perhaps you can speak to a nurse or physician assistant on staff or schedule a telephone appointment.
- Take information home. Ask for written instructions. Your doctor may also have brochures and audio and videotapes that can help you.
- After leaving the doctor's office, take responsibility for your care. If you have questions, call. If your symptoms get worse or if you have problems with your medication, call. If you had tests and do not hear from your doctor, call for your test results. If your doctor recommended that you have certain tests, schedule an appointment to get them done. If your doctor said you should see an additional specialist, make an appointment.

By following these steps, you will enhance the relationship you will have with your physician.

## Broader Health-Related Resources

In addition to the references above, the NIH has set up guidance Web sites that can help patients find healthcare professionals. These include:[16]

- Caregivers:
  **http://www.nlm.nih.gov/medlineplus/caregivers.html**
- Choosing a Doctor or Healthcare Service:
  **http://www.nlm.nih.gov/medlineplus/choosingadoctororhealthcareservice.html**
- Hospitals and Health Facilities:
  **http://www.nlm.nih.gov/medlineplus/healthfacilities.html**

[16] You can access this information at:
**http://www.nlm.nih.gov/medlineplus/healthsystem.html**.

# PART II: ADDITIONAL RESOURCES AND ADVANCED MATERIAL

## ABOUT PART II

In Part II, we introduce you to additional resources and advanced research on pinworm infection. All too often, patients who conduct their own research are overwhelmed by the difficulty in finding and organizing information. The purpose of the following chapters is to provide you an organized and structured format to help you find additional information resources on pinworm infection. In Part II, as in Part I, our objective is not to interpret the latest advances on pinworm infection or render an opinion. Rather, our goal is to give you access to original research and to increase your awareness of sources you may not have already considered. In this way, you will come across the advanced materials often referred to in pamphlets, books, or other general works. Once again, some of this material is technical in nature, so consultation with a professional familiar with pinworm infection is suggested.

# CHAPTER 3. STUDIES ON PINWORM INFECTION

## Overview

Every year, academic studies are published on pinworm infection or related conditions. Broadly speaking, there are two types of studies. The first are peer reviewed. Generally, the content of these studies has been reviewed by scientists or physicians. Peer-reviewed studies are typically published in scientific journals and are usually available at medical libraries. The second type of studies is non-peer reviewed. These works include summary articles that do not use or report scientific results. These often appear in the popular press, newsletters, or similar periodicals.

In this chapter, we will show you how to locate peer-reviewed references and studies on pinworm infection. We will begin by discussing research that has been summarized and is free to view by the public via the Internet. We then show you how to generate a bibliography on pinworm infection and teach you how to keep current on new studies as they are published or undertaken by the scientific community.

## Federally-Funded Research on Pinworm Infection

The U.S. Government supports a variety of research studies relating to pinworm infection and associated conditions. These studies are tracked by the Office of Extramural Research at the National Institutes of Health.[17]

[17] Healthcare projects are funded by the National Institutes of Health (NIH), Substance Abuse and Mental Health Services (SAMHSA), Health Resources and Services Administration (HRSA), Food and Drug Administration (FDA), Centers for Disease Control and Prevention (CDCP), Agency for Healthcare Research and Quality (AHRQ), and Office of Assistant Secretary of Health (OASH).

CRISP (Computerized Retrieval of Information on Scientific Projects) is a searchable database of federally-funded biomedical research projects conducted at universities, hospitals, and other institutions. Visit the CRISP Web site at **http://commons.cit.nih.gov/crisp3/CRISP.Generate_Ticket**. You can perform targeted searches by various criteria including geography, date, as well as topics related to pinworm infection and related conditions.

For most of the studies, the agencies reporting into CRISP provide summaries or abstracts. As opposed to clinical trial research using patients, many federally-funded studies use animals or simulated models to explore pinworm infection and related conditions. In some cases, therefore, it may be difficult to understand how some basic or fundamental research could eventually translate into medical practice. The following sample is typical of the type of information found when searching the CRISP database for pinworm infection:

- **Project Title: Pinworm: a Self Tolerance and Autoimmune Disease Modifie**

  Principal Investigator & Institution: Tung, Kenneth S.; Professor; Pathology; University of Virginia Charlottesville Box 400195 Charlottesville, Va 22904

  Timing: Fiscal Year 2000; Project Start 0-SEP-1999; Project End 1-AUG-2002

  Summary: We recently identified a common environmental agent with the potential capacity to terminate self tolerance and to strongly enhance autoimmune response and disease. The purpose of our proposal is to establish a causal link for this environmental effect. Neonatal female mice in a colony infested with rodent pinworm (Syphacia obvelata) were no longer tolerant or unresponsive to the ovarian peptide pZP3, or to the lupus-related peptide pRo60. When injected with pZP3 at birth (given in water, without adjuvant), the mice developed a strong Th2 response to pZP3 with production of IL4 and IL5 (and not IFNgamma), IgGI-dominant autoantibodies, and eosinophilic oophoritis. The Th2 response was recalled upon challenge as adults with pZP3 in CFA, indicating a long lasting Th2 memory for pZP3. Neonatal injection of the lupus-related pRo60 peptide in water also led to diversified antibody response to distant Ro60 epitopes, and memory for pRo60. When pinworm infection was eradicated by fenbendazole, the Th2 neonatal response to pZP3 instantly disappeared. These findings support an association between pinworm infection and autoimmunity, and have prompted a novel hypothesis of autoimmunity pathogenesis. In presence of an environmental modifier (pinworm infestation), stimulation by self or

crossreactive foreign antigen (pZP3 in water) early in life, terminates or prevents self-tolerance to the antigen; instead, it provokes T cell response and memory. This may result in early- onset autoimmune disease, or it may confer adult-onset acute or chronic autoimmune disease on subsequent antigen challenge. The data further support a pathogenic Th2-mediated autoimmune response. In Aim 1, we will establish the causal role of pinworm infection on the neonatal Th2 response to pZP3 by studying clean mice deliberately infected with pinworm. We will determine if the (phenomenon is triggered by another rodent nematode Heligmosomoides polygvrus, whether pinworm affects the response to other self antigens, and whether pinworm infection triggers autoimmune ovarian disease by non-ovarian peptides that crossreact with pZP3. Aim 2 will focus on one potential mechanism of the pinworm effect. We hypothesize that pinworm infestation leads to activation of the immature neonatal antigen presenting cells (APC). The modified APC then present the pZP3 to naive T cells, to elicit a Th2-biased autoimmune response. We will examine whether pinworm-infested mice have activated APC. If they do, we will inhibit the neonatal response by blocking APC activation. In summary, with this hypothesis-driven proposal, we will explore a common and natural infectious agent and its capacity to terminate self tolerance and provoke autoimmune disease in neonatal mice.

Website: http://commons.cit.nih.gov/crisp3/CRISP.Generate_Ticket

## The National Library of Medicine: PubMed

One of the quickest and most comprehensive ways to find academic studies in both English and other languages is to use PubMed, maintained by the National Library of Medicine. The advantage of PubMed over previously mentioned sources is that it covers a greater number of domestic and foreign references. It is also free to the public.[18] If the publisher has a Web site that offers full text of its journals, PubMed will provide links to that site, as well as to sites offering other related data. User registration, a subscription fee, or some other type of fee may be required to access the full text of articles in some journals.

[18] PubMed was developed by the National Center for Biotechnology Information (NCBI) at the National Library of Medicine (NLM) at the National Institutes of Health (NIH). The PubMed database was developed in conjunction with publishers of biomedical literature as a search tool for accessing literature citations and linking to full-text journal articles at Web sites of participating publishers. Publishers that participate in PubMed supply NLM with their citations electronically prior to or at the time of publication.

To generate your own bibliography of studies dealing with pinworm infection, simply go to the PubMed Web site at **www.ncbi.nlm.nih.gov/pubmed**. Type "pinworm infection" (or synonyms) into the search box, and click "Go." The following is the type of output you can expect from PubMed for "pinworm infection" (hyperlinks lead to article summaries):

- **Comparison between patterns of pinworm infection (Aspiculuris tetraptera) in wild and laboratory strains of mice, Mus musculus.**
  Author(s): Derothe JM, Loubes C, Orth A, Renaud F, Moulia C.
  Source: International Journal for Parasitology. 1997 June; 27(6): 645-51.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=9229248&dopt=Abstract

- **In whom does pinworm infection itch?**
  Author(s): Ganor S.
  Source: International Journal of Dermatology. 1987 December; 26(10): 667. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=3429103&dopt=Abstract

- **Pinworm control and risk factors of pinworm infection among primary-school children in Taiwan.**
  Author(s): Sung JF, Lin RS, Huang KC, Wang SY, Lu YJ.
  Source: Am J Trop Med Hyg. 2001 November; 65(5): 558-62.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11716114&dopt=Abstract

- **Pinworm infection.**
  Author(s): Matsushita M, Takakuwa H, Nishio A, Tominaga M.
  Source: Gastrointestinal Endoscopy. 2001 February; 53(2): 210. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11174297&dopt=Abstract

- **Pinworm infection. A five-year study.**
  Author(s): Wagner ED.
  Source: Med Arts Sci. 1965; 19(4): 135-41. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=5862856&dopt=Abstract

- **Reinfection in enterobiasis (pinworm infection). Simultaneous treatment of family members.**
  Author(s): Matsen JM, Turner JA.
  Source: Am J Dis Child. 1969 October; 118(4): 576-81. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=5820600&dopt=Abstract

- **Studies on enterobiasis. 3. The incidence of pinworm infection in a Mysore school.**
  Author(s): Sengbusch HG.
  Source: Indian J Pediatr. 1970 June; 37(269): 229-38. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=5505611&dopt=Abstract

- **The thymus dependency of resistance to pinworm infection in mice.**
  Author(s): Jacobson RH, Reed ND.
  Source: J Parasitol. 1974 December; 60(6): 976-9. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=4612129&dopt=Abstract

- **Therapy of pinworm infection.**
  Author(s): Shlansky E.
  Source: American Family Physician. 1974 November; 10(5): 214-5. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=4429643&dopt=Abstract

- **A longitudinal study of enterobiasis in three day care centers of Havana City.**
  Author(s): Nunez FA, Hernandez M, Finlay CM.
  Source: Revista Do Instituto De Medicina Tropical De Sao Paulo. 1996 March-April; 38(2): 129-32.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=9071032&dopt=Abstract

- **Chemotherapeutic trial to control enterobiasis in schoolchildren.**
  Author(s): Yang YS, Kim SW, Jung SH, Huh S, Lee JH.

Source: Korean J Parasitol. 1997 December; 35(4): 265-9.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=9446908&dopt=Abstract

- **Chemotherapy of enterobiasis (oxyuriasis).**
  Author(s): St Georgiev V.
  Source: Expert Opin Pharmacother. 2001 February; 2(2): 267-75. Review.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11336585&dopt=Abstract

- **Enterobius vermicularis threadworm infestation of paraovarian tissue in a woman who has had a hysterectomy.**
  Author(s): Dundas KC, Calder AA, Alyusuf R.
  Source: Br J Obstet Gynaecol. 1999 June; 106(6): 605-7. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=10426622&dopt=Abstract

- **Epidemiology and control of enterobiasis in a developmental center.**
  Author(s): Lohiya GS, Tan-Figueroa L, Crinella FM, Lohiya S.
  Source: The Western Journal of Medicine. 2000 May; 172(5): 305-8.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=10832422&dopt=Abstract

- **Human enterobiasis in evolution: origin, specificity and transmission.**
  Author(s): Hugot JP, Reinhard KJ, Gardner SL, Morand S.
  Source: Parasite. 1999 September; 6(3): 201-8.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=10511967&dopt=Abstract

- **Ileal and colonic ulceration due to enterobiasis.**
  Author(s): Beattie RM, Walker-Smith JA, Domizio P.
  Source: Journal of Pediatric Gastroenterology and Nutrition. 1995 August; 21(2): 232-4. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=7472913&dopt=Abstract

- **Prevalence of enterobiasis and its incidence after blanket chemotherapy in a male orphanage.**
  Author(s): Sirivichayakul C, Pojjaroen-anant C, Wisetsing P, Lalitphiphat A, Chanthavanich P, Kabkaew K.

Source: Southeast Asian J Trop Med Public Health. 2000 March; 31(1): 144-6.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11023083&dopt=Abstract

- **Progressive eosinophilia and elevated IgE in enterobiasis.**
  Author(s): Villarreal O, Villarreal JJ, Domingo JA.
  Source: Allergy. 1999 June; 54(6): 646-8. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=10435486&dopt=Abstract

- **Review of enterobiasis in Taiwan and offshore islands.**
  Author(s): Fan PC.
  Source: J Microbiol Immunol Infect. 1998 December; 31(4): 203-10. Review.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=10496160&dopt=Abstract

- **Tackling a visitation of threadworms.**
  Author(s): Sinclair A.
  Source: Prof Care Mother Child. 1997; 7(2): 53-4. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=9220833&dopt=Abstract

- **Tackling threadworms.**
  Author(s): Harcup J.
  Source: Prof Care Mother Child. 1995; 5(1): 15-6.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=8680209&dopt=Abstract

- **The prevalence of enterobiasis in children attending mobile health clinic of Huachiew Chalermprakiet University.**
  Author(s): Nithikathkul C, Changsap B, Wannapinyosheep S, Poister C, Boontan P.
  Source: Southeast Asian J Trop Med Public Health. 2001; 32 Suppl 2: 138-42.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=12041578&dopt=Abstract

- **Threadworm infections.**
  Author(s): Finn L.

Source: Community Nurse. 1996 August; 2(7): 39. Review. No Abstract Available.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=9455265&dopt=Abstract

- **Threadworms: a starting point for family hygiene.**
  Author(s): Ibarra J.
  Source: British Journal of Community Nursing. 2001 August; 6(8): 414-20.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11865209&dopt=Abstract

## Vocabulary Builder

**Adjuvant:** A substance which aids another, such as an auxiliary remedy; in immunology, nonspecific stimulator (e.g., BCG vaccine) of the immune response. [EU]

**Antibody:** An immunoglobulin molecule that has a specific amino acid sequence by virtue of which it interacts only with the antigen that induced its synthesis in cells of the lymphoid series (especially plasma cells), or with antigen closely related to it. Antibodies are classified according to their ode of action as agglutinins, bacteriolysins, haemolysins, opsonins, precipitins, etc. [EU]

**Antigen:** Any substance which is capable, under appropriate conditions, of inducing a specific immune response and of reacting with the products of that response, that is, with specific antibody or specifically sensitized T-lymphocytes, or both. Antigens may be soluble substances, such as toxins and foreign proteins, or particulate, such as bacteria and tissue cells; however, only the portion of the protein or polysaccharide molecule known as the antigenic determinant (q.v.) combines with antibody or a specific receptor on a lymphocyte. Abbreviated Ag. [EU]

**Ascariasis:** Infection by nematodes of the genus ascaris. Ingestion of infective eggs causes diarrhea and pneumonitis. Its distribution is more prevalent in areas of poor sanitation and where human feces are used for fertilizer. [NIH]

**Autoimmunity:** Process whereby the immune system reacts against the body's own tissues. Autoimmunity may produce or be caused by autoimmune diseases. [NIH]

**Chronic:** Persisting over a long period of time. [EU]

**Endemic:** Present or usually prevalent in a population or geographical area

at all times; said of a disease or agent. Called also endemial. [EU]

**Epitopes:** Sites on an antigen that interact with specific antibodies. [NIH]

**Fenbendazole:** Antinematodal benzimidazole used in veterinary medicine. [NIH]

**Lupus:** A form of cutaneous tuberculosis. It is seen predominantly in women and typically involves the nasal, buccal, and conjunctival mucosa. [NIH]

**Neonatal:** Pertaining to the first four weeks after birth. [EU]

**Oophoritis:** Inflammation of an ovary. [NIH]

**Prevalence:** The total number of cases of a given disease in a specified population at a designated time. It is differentiated from incidence, which refers to the number of new cases in the population at a given time. [NIH]

**Tolerance:** 1. the ability to endure unusually large doses of a drug or toxin. 2. acquired drug tolerance; a decreasing response to repeated constant doses of a drug or the need for increasing doses to maintain a constant response. [EU]

**Trichinosis:** A disease due to infection with trichinella spiralis. It is caused by eating undercooked meat, usually pork. [NIH]

# CHAPTER 4. BOOKS ON PINWORM INFECTION

## Overview

This chapter provides bibliographic book references relating to pinworm infection. You have many options to locate books on pinworm infection. The simplest method is to go to your local bookseller and inquire about titles that they have in stock or can special order for you. Some patients, however, feel uncomfortable approaching their local booksellers and prefer online sources (e.g. **www.amazon.com** and **www.bn.com**). In addition to online booksellers, excellent sources for book titles on pinworm infection include the Combined Health Information Database and the National Library of Medicine. Once you have found a title that interests you, visit your local public or medical library to see if it is available for loan.

## The National Library of Medicine Book Index

The National Library of Medicine at the National Institutes of Health has a massive database of books published on healthcare and biomedicine. Go to the following Internet site, **http://locatorplus.gov/**, and then select "Search LOCATORplus." Once you are in the search area, simply type "pinworm infection" (or synonyms) into the search box, and select "books only." From there, results can be sorted by publication date, author, or relevance. The following was recently catalogued by the National Library of Medicine:[19]

[19] In addition to LOCATORPlus, in collaboration with authors and publishers, the National Center for Biotechnology Information (NCBI) is adapting biomedical books for the Web. The books may be accessed in two ways: (1) by searching directly using any search term or phrase (in the same way as the bibliographic database PubMed), or (2) by following the links to PubMed abstracts. Each PubMed abstract has a "Books" button that displays a

- **Challenge of hospital acquired infection.** Author: Karen Taylor, Rosalind Plowman, and Jennifer A. Roberts; Year: 2001; Norwich: Stationery Office, [2001?]; ISBN: 0117028584
- **Dates in infectious diseases.** Author: edited by H.S.J. Lee; Year: 2002; Boca Raton: Parthenon Pub. Group, c2002; ISBN: 1842141503 http://www.amazon.com/exec/obidos/ASIN/1842141503/icongroupinterna
- **Firepower in the lab: automation in the fight against infectious diseases and bioterrorism.** Author: Scott P. Layne, Tony J. Beugelsdijk, and D. Kumar N. Patel, editors; Year: 2001; Washington D.C.: Joseph Henry Press, c2001; ISBN: 0309068495 http://www.amazon.com/exec/obidos/ASIN/0309068495/icongroupinterna
- **Guidance for manufacturers seeking marketing clearance of ear, nose, and throat endoscope sheaths used as protective barriers.** Author: Center for Devices and Radiological Health; Year: 2000; Rockville, MD: Center for Devices and Radiological Health, 2000
- **Guide to infection control in the hospital.** Author: R. Wenzel ... [et al.]; Year: 1998; Hamilton, Ont.: B.C. Decker; Malden, MA: Blackwell Science [U.S. distributor], 1998; ISBN: 1550090593 http://www.amazon.com/exec/obidos/ASIN/1550090593/icongroupinterna
- **Infection control in clinical practice.** Author: Jennie Wilson; foreword by Liz A. Jenner; Year: 2001; New York: Bailliere Tindall, 2001; ISBN: 0702025542 http://www.amazon.com/exec/obidos/ASIN/0702025542/icongroupinterna
- **Infection control in the ICU environment.** Author: edited by Robert A. Weinstein, Marc J.M. Bonten; Year: 2002; Boston: Kluwer, c2002; ISBN: 0792374150 (hardback: alk. paper) http://www.amazon.com/exec/obidos/ASIN/0792374150/icongroupinterna
- **Infection highlights, 2000-01.** Author: edited by Mark H. Wilcox; Year: 2001; Oxford: Health Press, c2001; ISBN: 1899541942 http://www.amazon.com/exec/obidos/ASIN/1899541942/icongroupinterna

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facsimile of the abstract in which some phrases are hypertext links. These phrases are also found in the books available at NCBI. Click on hyperlinked results in the list of books in which the phrase is found. Currently, the majority of the links are between the books and PubMed. In the future, more links will be created between the books and other types of information, such as gene and protein sequences and macromolecular structures. See **http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=Books.**

- **Infection in the critically ill: an ongoing challenge.** Author: Van Saene, H.K.F., Sganga, G., Silvestri, L., eds; Year: 2001; Milano; New York: Springer, c2001; ISBN: 8847001382 (pbk.)
  http://www.amazon.com/exec/obidos/ASIN/8847001382/icongroupinterna
- **Infection, resistance and immunity.** Author: Julius P. Kreier; Year: 2002; New York, NY: Taylor; Francis, c2002; ISBN: 9057025957
  http://www.amazon.com/exec/obidos/ASIN/9057025957/icongroupinterna
- **Intensive care infections: a practical guide to diagnosis and management in adult patients.** Author: Hilary Humphreys, Sheila M. Willatts, Jean-Louis Vincent; Year: 2000; London; New York: W.B. Saunders, 2000; ISBN: 070202242X
  http://www.amazon.com/exec/obidos/ASIN/070202242X/icongroupinterna
- **Management of infections in immunocompromised patients.** Author: [edited by] Michel P. Glauser, Philip A. Pizzo; Year: 2000; London; New York: W.B. Saunders, 2000; ISBN: 0702025062
  http://www.amazon.com/exec/obidos/ASIN/0702025062/icongroupinterna
- **Medical microbiology: a guide to microbial infections: pathogenesis, immunity, laboratory diagnosis, and control.** Author: edited by David Greenwood, Richard B. Slack, John F. Peutherer; Year: 2002; Edinburgh; New York: Churchill Livingstone, 2002; ISBN: 0443070776
  http://www.amazon.com/exec/obidos/ASIN/0443070776/icongroupinterna
- **Microbiology and infection control for health professionals.** Author: Gary Lee, Penny Bishop; Year: 2002; Frenchs Forest, N.S.W.; Pearson Education Australia, c2002; ISBN: 1740093232
- **Microbiology and infection.** Author: Timothy J.J. Inglis, David Speers, Michael J. Leung; Year: 2002; Edinburgh; New York: Churchill Livingstone, 2002; ISBN: 044305844X
  http://www.amazon.com/exec/obidos/ASIN/044305844X/icongroupinterna
- **New threat of drug-resistant microbes: the return of untreatable common infections?** Author: by Sharon Krystofiak; Year: 2000; South Easton, MA: Western Schools Press, c2000; ISBN: 1578010330
  http://www.amazon.com/exec/obidos/ASIN/1578010330/icongroupinterna
- **Oral and maxillofacial infections.** Author: [edited by] Richard G. Topazian, Morton H. Goldberg, James R. Hupp; Year: 2002; Philadelphia: W.B. Saunders Co., c2002; ISBN: 0721692710

http://www.amazon.com/exec/obidos/ASIN/0721692710/icongroupinterna

## Chapters on Pinworm Infection

Frequently, pinworm infection will be discussed within a book, perhaps within a specific chapter. In order to find chapters that are specifically dealing with pinworm infection, an excellent source of abstracts is the Combined Health Information Database. You will need to limit your search to book chapters and pinworm infection using the "Detailed Search" option. Go directly to the following hyperlink: **http://chid.nih.gov/detail/detail.html**. To find book chapters, use the drop boxes at the bottom of the search page where "You may refine your search by." Select the dates and language you prefer, and the format option "Book Chapter." By making these selections and typing in "pinworm infection" (or synonyms) into the "For these words:" box, you will only receive results on chapters in books.

## General Home References

In addition to references for pinworm infection, you may want a general home medical guide that spans all aspects of home healthcare. The following list is a recent sample of such guides (sorted alphabetically by title; hyperlinks provide rankings, information, and reviews at Amazon.com):

- **Encyclopedia of Infectious Diseases (Encyclopedia of Infectious Diseases, 1998)** by Carol Turkington, Bonnie Ashby; Library Binding - 384 pages (September 1998), Facts on File, Inc.; ISBN: 0816035121; **http://www.amazon.com/exec/obidos/ASIN/0816035121/icongroupinterna**
- **Epidemic! The World of Infectious Disease** by Rob Desalle (Editor), American Museum of Natural History; Paperback - 246 pages, 1st edition (September 1999), New Press; ISBN: 1565845463; **http://www.amazon.com/exec/obidos/ASIN/1565845463/icongroupinterna**
- **Outbreak Alert: Responding to the Increasing Threat of Infectious Diseases** by Jason Eberhart-Phillips, M.D.; Paperback - 292 pages (July 2000), New Harbinger Publications; ISBN: 1572242019; **http://www.amazon.com/exec/obidos/ASIN/1572242019/icongroupinterna**
- **Plague Time: How Stealth Infections Are Causing Cancers, Heart Disease, and Other Deadly Ailments** by Paul W. Ewald; Hardcover - 288

pages (November 2000), Free Press; ISBN: 0684869004;
**http://www.amazon.com/exec/obidos/ASIN/0684869004/icongroupinterna**

## Vocabulary Builder

**Bioterrorism:** The use of biological agents in terrorism. This includes the malevolent use of bacteria, viruses, or toxins against people, animals, or plants. [NIH]

**Disinfection:** Rendering pathogens harmless through the use of heat, antiseptics, antibacterial agents, etc. [NIH]

**Gastrointestinal:** Pertaining to or communicating with the stomach and intestine, as a gastrointestinal fistula. [EU]

**Prophylaxis:** The prevention of disease; preventive treatment. [EU]

# CHAPTER 5. MULTIMEDIA ON PINWORM INFECTION

## Overview

Information on pinworm infection can come in a variety of formats. Among multimedia sources, video productions, slides, audiotapes, and computer databases are often available. In this chapter, we show you how to keep current on multimedia sources of information on pinworm infection. We start with sources that have been summarized by federal agencies, and then show you how to find bibliographic information catalogued by the National Library of Medicine. If you see an interesting item, visit your local medical library to check on the availability of the title.

## Bibliography: Multimedia on Pinworm Infection

The National Library of Medicine is a rich source of information on healthcare-related multimedia productions including slides, computer software, and databases. To access the multimedia database, go to the following Web site: **http://locatorplus.gov/**. Select "Search LOCATORplus." Once in the search area, simply type in pinworm infection (or synonyms). Then, in the option box provided below the search box, select "Audiovisuals and Computer Files." From there, you can choose to sort results by publication date, author, or relevance. The following multimedia has been indexed on pinworm infection. For more information, follow the hyperlink indicated:

- **Aseptic technique: an essential strategy for infection control.** Source: Envision Incorporated; APIC, Association for Professionals in Infection Control and Epidemiology, Inc; Year: 2001; Format: Videorecording; Nashville, TN: Envision, [2001]

- **Enterobiasis: pinworm infection.** Source: William F. Myers; produced by the Dept. of Microbiology, in cooperation with the Office of Medical Education, University of Maryland, School of Medicine; Year: 1978; Format: Slide; Baltimore: University Park Press, c1978
- **Infection control: break the chain.** Source: Coastal Health+Train; produced by Coastal Training Technologies Corp; Year: 1999; Format: Videorecording; Virginia Beach, VA: The Corp., c1999
- **Infection control for ambulatory care.** Source: Coastal Health+Train; produced by Coastal Training Technologies; Year: 2000; Format: Videorecording; Virginia Beach, VA: Coastal Training Technologies Corp., c2000
- **Infection control for home health .** Year: 1998; Format: Electronic resource; Columbia, Mo.: Graphic Education Corp., c1998
- **Infection control in behavioral healthcare.** Source: Coastal Health+Train; produced by Coastal Training Technologies; Year: 2002; Format: Videorecording; Virginia Beach, VA: Coastal Training Technologies Corp., c2002
- **Infection control in the dental office.** Source: [presented by] Health Science Productions in cooperation with the American Dental Assistants Association; produced by Dental Visions in cooperation with Millennium Pictures, Inc., and HSP, Inc; Year: 1999; Format: Videorecording; Birmingham, AL: Health Science Productions, c1999
- **Infection control.** Source: Graphic Education; Year: 2001; Format: Electronic resource; Columbia, MO: Graphic Education, c2001

## Vocabulary Builder

**Inflammation:** A pathological process characterized by injury or destruction of tissues caused by a variety of cytologic and chemical reactions. It is usually manifested by typical signs of pain, heat, redness, swelling, and loss of function. [NIH]

**Perioperative:** Pertaining to the period extending from the time of hospitalization for surgery to the time of discharge. [EU]

**Pneumonia:** Inflammation of the lungs with consolidation. [EU]

**Viral:** Pertaining to, caused by, or of the nature of virus. [EU]

# CHAPTER 6. PHYSICIAN GUIDELINES AND DATABASES

## Overview

Doctors and medical researchers rely on a number of information sources to help patients with their conditions. Many will subscribe to journals or newsletters published by their professional associations or refer to specialized textbooks or clinical guides published for the medical profession. In this chapter, we focus on databases and Internet-based guidelines created or written for this professional audience.

## NIH Guidelines

For the more common diseases, The National Institutes of Health publish guidelines that are frequently consulted by physicians. Publications are typically written by one or more of the various NIH Institutes. For physician guidelines, commonly referred to as "clinical" or "professional" guidelines, you can visit the following Institutes:

- Office of the Director (OD); guidelines consolidated across agencies available at **http://www.nih.gov/health/consumer/conkey.htm**
- National Institute of General Medical Sciences (NIGMS); fact sheets available at **http://www.nigms.nih.gov/news/facts/**
- National Library of Medicine (NLM); extensive encyclopedia (A.D.A.M., Inc.) with guidelines: **http://www.nlm.nih.gov/medlineplus/healthtopics.html**
- National Institute of Allergy and Infectious Diseases (NIAID); guidelines available at **http://www.niaid.nih.gov/publications/**

- Centers for Disease Control and Prevention; various fact sheets on infectious diseases available at **http://www.cdc.gov/health/diseases.htm**

## NIH Databases

In addition to the various Institutes of Health that publish professional guidelines, the NIH has designed a number of databases for professionals.[20] Physician-oriented resources provide a wide variety of information related to the biomedical and health sciences, both past and present. The format of these resources varies. Searchable databases, bibliographic citations, full text articles (when available), archival collections, and images are all available. The following are referenced by the National Library of Medicine:[21]

- **Bioethics:** Access to published literature on the ethical, legal and public policy issues surrounding healthcare and biomedical research. This information is provided in conjunction with the Kennedy Institute of Ethics located at Georgetown University, Washington, D.C.: **http://www.nlm.nih.gov/databases/databases_bioethics.html**
- **HIV/AIDS Resources:** Describes various links and databases dedicated to HIV/AIDS research: **http://www.nlm.nih.gov/pubs/factsheets/aidsinfs.html**
- **NLM Online Exhibitions:** Describes "Exhibitions in the History of Medicine": **http://www.nlm.nih.gov/exhibition/exhibition.html**. Additional resources for historical scholarship in medicine: **http://www.nlm.nih.gov/hmd/hmd.html**
- **Biotechnology Information:** Access to public databases. The National Center for Biotechnology Information conducts research in computational biology, develops software tools for analyzing genome data, and disseminates biomedical information for the better understanding of molecular processes affecting human health and disease: **http://www.ncbi.nlm.nih.gov/**
- **Population Information:** The National Library of Medicine provides access to worldwide coverage of population, family planning, and related health issues, including family planning technology and programs, fertility, and population law and policy: **http://www.nlm.nih.gov/databases/databases_population.html**

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[20] Remember, for the general public, the National Library of Medicine recommends the databases referenced in MEDLINE*plus* (**http://medlineplus.gov/** or **http://www.nlm.nih.gov/medlineplus/databases.html**).

[21] See **http://www.nlm.nih.gov/databases/databases.html**.

- **Cancer Information:** Access to caner-oriented databases: **http://www.nlm.nih.gov/databases/databases_cancer.html**
- **Profiles in Science:** Offering the archival collections of prominent twentieth-century biomedical scientists to the public through modern digital technology: **http://www.profiles.nlm.nih.gov/**
- **Chemical Information:** Provides links to various chemical databases and references: **http://sis.nlm.nih.gov/Chem/ChemMain.html**
- **Clinical Alerts:** Reports the release of findings from the NIH-funded clinical trials where such release could significantly affect morbidity and mortality: **http://www.nlm.nih.gov/databases/alerts/clinical_alerts.html**
- **Space Life Sciences:** Provides links and information to space-based research (including NASA): **http://www.nlm.nih.gov/databases/databases_space.html**
- **MEDLINE:** Bibliographic database covering the fields of medicine, nursing, dentistry, veterinary medicine, the healthcare system, and the pre-clinical sciences: **http://www.nlm.nih.gov/databases/databases_medline.html**
- **Toxicology and Environmental Health Information (TOXNET):** Databases covering toxicology and environmental health: **http://sis.nlm.nih.gov/Tox/ToxMain.html**
- **Visible Human Interface:** Anatomically detailed, three-dimensional representations of normal male and female human bodies: **http://www.nlm.nih.gov/research/visible/visible_human.html**

While all of the above references may be of interest to physicians who study and treat pinworm infection, the following are particularly noteworthy.

### The Combined Health Information Database

A comprehensive source of information on clinical guidelines written for professionals is the Combined Health Information Database. You will need to limit your search to "Brochure/Pamphlet," "Fact Sheet," or "Information Package" and pinworm infection using the "Detailed Search" option. Go directly to the following hyperlink: **http://chid.nih.gov/detail/detail.html**. To find associations, use the drop boxes at the bottom of the search page where "You may refine your search by." For the publication date, select "All Years," select your preferred language, and the format option "Fact Sheet." By making these selections and typing "pinworm infection" (or synonyms)

into the "For these words:" box above, you will only receive results on fact sheets dealing with pinworm infection. The following is a sample result:

- **Another Hazard in Food: Helminthic Parasites**

  Source: Patient Care. 31(9): 60-62, 71. May 15, 1997.

  Summary: This article describes the problem of helminthic parasites (worms and flukes) in food. The author notes that the incidence of disease caused by intestinal parasites has increased in the United States in recent years. This is attributable in part to the frequency of opportunistic parasitic infections in patients with AIDS, as well as to improvements in the detection of these infections. The immigration of large numbers of people from endemic areas such as Southeast Asia, the Caribbean, South America, and Asia, has further affected the prevalence of these diseases. The author describes enterobiasis (pinworm), ascariasis, trichinosis (round worm), cysticercosis (a type of tapeworm), and neurocysticercosis. The author also discusses treatment options, reporting these infectious diseases, keeping track of the epidemiology of these diseases, risk factors (travel, certain dietary and cultural influences), and prevention and education strategies. 3 figures. 7 references. (AA-M).

### The NLM Gateway[22]

The NLM (National Library of Medicine) Gateway is a Web-based system that lets users search simultaneously in multiple retrieval systems at the U.S. National Library of Medicine (NLM). It allows users of NLM services to initiate searches from one Web interface, providing "one-stop searching" for many of NLM's information resources or databases.[23] One target audience for the Gateway is the Internet user who is new to NLM's online resources and does not know what information is available or how best to search for it. This audience may include physicians and other healthcare providers, researchers, librarians, students, and, increasingly, patients, their families, and the public.[24] To use the NLM Gateway, simply go to the search site at

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[22] Adapted from NLM: **http://gateway.nlm.nih.gov/gw/Cmd?Overview.x**.

[23] The NLM Gateway is currently being developed by the Lister Hill National Center for Biomedical Communications (LHNCBC) at the National Library of Medicine (NLM) of the National Institutes of Health (NIH).

[24] Other users may find the Gateway useful for an overall search of NLM's information resources. Some searchers may locate what they need immediately, while others will utilize the Gateway as an adjunct tool to other NLM search services such as PubMed® and MEDLINEplus®. The Gateway connects users with multiple NLM retrieval systems while also providing a search interface for its own collections. These collections include various types of information that do not logically belong in PubMed, LOCATORplus, or other

**http://gateway.nlm.nih.gov/gw/Cmd**. Type "pinworm infection" (or synonyms) into the search box and click "Search." The results will be presented in a tabular form, indicating the number of references in each database category.

**Results Summary**

| Category | Items Found |
|---|---|
| Journal Articles | 345302 |
| Books / Periodicals / Audio Visual | 2567 |
| Consumer Health | 294 |
| Meeting Abstracts | 3093 |
| Other Collections | 100 |
| Total | 351356 |

### HSTAT[25]

HSTAT is a free, Web-based resource that provides access to full-text documents used in healthcare decision-making.[26] HSTAT's audience includes healthcare providers, health service researchers, policy makers, insurance companies, consumers, and the information professionals who serve these groups. HSTAT provides access to a wide variety of publications, including clinical practice guidelines, quick-reference guides for clinicians, consumer health brochures, evidence reports and technology assessments from the Agency for Healthcare Research and Quality (AHRQ), as well as AHRQ's Put Prevention Into Practice.[27] Simply search by "pinworm infection" (or synonyms) at the following Web site: **http://text.nlm.nih.gov**.

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established NLM retrieval systems (e.g., meeting announcements and pre-1966 journal citations). The Gateway will provide access to the information found in an increasing number of NLM retrieval systems in several phases.

[25] Adapted from HSTAT: **http://www.nlm.nih.gov/pubs/factsheets/hstat.html**.

[26] The HSTAT URL is **http://hstat.nlm.nih.gov/**.

[27] Other important documents in HSTAT include: the National Institutes of Health (NIH) Consensus Conference Reports and Technology Assessment Reports; the HIV/AIDS Treatment Information Service (ATIS) resource documents; the Substance Abuse and Mental Health Services Administration's Center for Substance Abuse Treatment (SAMHSA/CSAT) Treatment Improvement Protocols (TIP) and Center for Substance Abuse Prevention (SAMHSA/CSAP) Prevention Enhancement Protocols System (PEPS); the Public Health Service (PHS) Preventive Services Task Force's *Guide to Clinical Preventive Services*; the independent, nonfederal Task Force on Community Services *Guide to Community Preventive Services*; and the Health Technology Advisory Committee (HTAC) of the Minnesota Health Care Commission (MHCC) health technology evaluations.

### Coffee Break: Tutorials for Biologists[28]

Some patients may wish to have access to a general healthcare site that takes a scientific view of the news and covers recent breakthroughs in biology that may one day assist physicians in developing treatments. To this end, we recommend "Coffee Break," a collection of short reports on recent biological discoveries. Each report incorporates interactive tutorials that demonstrate how bioinformatics tools are used as a part of the research process. Currently, all Coffee Breaks are written by NCBI staff.[29] Each report is about 400 words and is usually based on a discovery reported in one or more articles from recently published, peer-reviewed literature.[30] This site has new articles every few weeks, so it can be considered an online magazine of sorts, and intended for general background information. You can access the Coffee Break Web site at **http://www.ncbi.nlm.nih.gov/Coffeebreak/**.

## Other Commercial Databases

In addition to resources maintained by official agencies, other databases exist that are commercial ventures addressing medical professionals. Here are a few examples that may interest you:

- **CliniWeb International:** Index and table of contents to selected clinical information on the Internet; see **http://www.ohsu.edu/cliniweb/**.
- **Image Engine:** Multimedia electronic medical record system that integrates a wide range of digitized clinical images with textual data stored in the University of Pittsburgh Medical Center's MARS electronic medical record system; see the following Web site: **http://www.cml.upmc.edu/cml/imageengine/imageEngine.html**.
- **Medical World Search:** Searches full text from thousands of selected medical sites on the Internet; see **http://www.mwsearch.com/**.
- **MedWeaver:** Prototype system that allows users to search differential diagnoses for any list of signs and symptoms, to search medical

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[28] Adapted from **http://www.ncbi.nlm.nih.gov/Coffeebreak/Archive/FAQ.html**.

[29] The figure that accompanies each article is frequently supplied by an expert external to NCBI, in which case the source of the figure is cited. The result is an interactive tutorial that tells a biological story.

[30] After a brief introduction that sets the work described into a broader context, the report focuses on how a molecular understanding can provide explanations of observed biology and lead to therapies for diseases. Each vignette is accompanied by a figure and hypertext links that lead to a series of pages that interactively show how NCBI tools and resources are used in the research process.

literature, and to explore relevant Web sites; see **http://www.med.virginia.edu/~wmd4n/medweaver.html**.

- **Metaphrase:** Middleware component intended for use by both caregivers and medical records personnel. It converts the informal language generally used by caregivers into terms from formal, controlled vocabularies; see **http://www.lexical.com/Metaphrase.html**.

## Specialized References

The following books are specialized references written for professionals interested in pinworm infection (sorted alphabetically by title, hyperlinks provide rankings, information, and reviews at Amazon.com):

- **2002 Pocket Book of Infectious Disease Therapy** by John G. Bartlett; Paperback - 348 pages, 11th edition (November 15, 2001), Lippincott, Williams & Wilkins Publishers; ISBN: 0781734320; **http://www.amazon.com/exec/obidos/ASIN/0781734320/icongroupinterna**
- **Concepts in Microbiology, Immunology, & Infectious Disease: A Review for the Usmle Step 1 (Usmle Concepts Series)** by Kapil Gupta; Paperback (May 1997), CRC Press-Parthenon Publishers; ISBN: 1850707979; **http://www.amazon.com/exec/obidos/ASIN/1850707979/icongroupinterna**
- **Current Diagnosis & Treatment in Infectious Diseases** by Walter R. Wilson (Editor), et al; Paperback - 985 pages, 1st edition (June 22, 2001), McGraw-Hill Professional Publishing; ISBN: 0838514944; **http://www.amazon.com/exec/obidos/ASIN/0838514944/icongroupinterna**
- **Hunter's Tropical Medicine and Emerging Infectious Diseases** by George W. Hunter (Editor), et al; Hardcover - 1192 pages, 8th edition (January 15, 2000), W B Saunders Co; ISBN: 0721662234; **http://www.amazon.com/exec/obidos/ASIN/0721662234/icongroupinterna**
- **Infectious Disease** by Barbara Bannister, et al; Paperback - 506 pages, 2nd edition (August 15, 2000), Blackwell Science Inc; ISBN: 0632053194; **http://www.amazon.com/exec/obidos/ASIN/0632053194/icongroupinterna**
- **Infectious Disease Epidemiology: Theory and Practice** by Kenrad E. Nelson, et al; Hardcover - 600 pages (May 2000), Aspen Publishers, Inc.; ISBN: 083421766X; **http://www.amazon.com/exec/obidos/ASIN/083421766X/icongroupinterna**
- **Infectious Diseases Diagnosis : Current Status and Future Trends (Parasitology, 117)** by H. V. Smith (Editor), et al; Paperback - 218 pages

(August 2000), Cambridge University Press; ISBN: 0521785073; **http://www.amazon.com/exec/obidos/ASIN/0521785073/icongroupinterna**

- **Infectious Diseases and Arthropods** by Jerome Goddard; Hardcover - 240 pages (November 1999), Humana Press; ISBN: 0896038254; **http://www.amazon.com/exec/obidos/ASIN/0896038254/icongroupinterna**
- **Mandell, Douglas, and Bennett's Principles & Practice of Infectious Diseases (2 Vol. Set)** by Gerald L. Mandell (Editor), et al; Hardcover - 3263 pages, 5th edition (June 15, 2000), Churchill Livingstone; ISBN: 044307593X; **http://www.amazon.com/exec/obidos/ASIN/044307593X/icongroupinterna**
- **Manual of Antibiotics and Infectious Diseases: Treatment and Prevention** by John E. Conte; Paperback - 755 pages, 9th edition (December 15, 2001), Lippincott, Williams & Wilkins Publishers; ISBN: 0781723167; **http://www.amazon.com/exec/obidos/ASIN/0781723167/icongroupinterna**
- **Molecular Epidemiology of Infectious Diseases** by R. C. Andrew Thompson; Hardcover - 326 pages, 1st edition (October 15, 2000), Edward Arnold; ISBN: 0340759097; **http://www.amazon.com/exec/obidos/ASIN/0340759097/icongroupinterna**
- **Tropical Medicine and Parasitology** by Wallace Peters, Geoffrey Pasvol; Paperback - 334 pages, 5th edition (January 15, 2002), Mosby-Year Book; ISBN: 0723431914; **http://www.amazon.com/exec/obidos/ASIN/0723431914/icongroupinterna**

## Vocabulary Builder

**Molecular:** Of, pertaining to, or composed of molecules : a very small mass of matter. [EU]

# PART III. APPENDICES

## ABOUT PART III

Part III is a collection of appendices on general medical topics which may be of interest to patients with pinworm infection and related conditions.

# APPENDIX A. RESEARCHING YOUR MEDICATIONS

## Overview

There are a number of sources available on new or existing medications which could be prescribed to patients with pinworm infection. While a number of hard copy or CD-Rom resources are available to patients and physicians for research purposes, a more flexible method is to use Internet-based databases. In this chapter, we will begin with a general overview of medications. We will then proceed to outline official recommendations on how you should view your medications. You may also want to research medications that you are currently taking for other conditions as they may interact with medications for pinworm infection. Research can give you information on the side effects, interactions, and limitations of prescription drugs used in the treatment of pinworm infection. Broadly speaking, there are two sources of information on approved medications: public sources and private sources. We will emphasize free-to-use public sources.

## Your Medications: The Basics[31]

The Agency for Health Care Research and Quality has published extremely useful guidelines on how you can best participate in the medication aspects of pinworm infection. Taking medicines is not always as simple as swallowing a pill. It can involve many steps and decisions each day. The AHCRQ recommends that patients with pinworm infection take part in treatment decisions. Do not be afraid to ask questions and talk about your concerns. By taking a moment to ask questions early, you may avoid problems later. Here are some points to cover each time a new medicine is prescribed**:**

- Ask about all parts of your treatment, including diet changes, exercise, and medicines.
- Ask about the risks and benefits of each medicine or other treatment you might receive.
- Ask how often you or your doctor will check for side effects from a given medication.

Do not hesitate to ask what is important to you about your medicines. You may want a medicine with the fewest side effects, or the fewest doses to take each day. You may care most about cost, or how the medicine might affect how you live or work. Or, you may want the medicine your doctor believes will work the best. Telling your doctor will help him or her select the best treatment for you.

Do not be afraid to "bother" your doctor with your concerns and questions about medications for pinworm infection. You can also talk to a nurse or a pharmacist. They can help you better understand your treatment plan. Feel free to bring a friend or family member with you when you visit your doctor. Talking over your options with someone you trust can help you make better choices, especially if you are not feeling well. Specifically, ask your doctor the following:

- The name of the medicine and what it is supposed to do.
- How and when to take the medicine, how much to take, and for how long.
- What food, drinks, other medicines, or activities you should avoid while taking the medicine.
- What side effects the medicine may have, and what to do if they occur.

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[31] This section is adapted from AHCRQ: **http://www.ahcpr.gov/consumer/ncpiebro.htm**.

- If you can get a refill, and how often.
- About any terms or directions you do not understand.
- What to do if you miss a dose.
- If there is written information you can take home (most pharmacies have information sheets on your prescription medicines; some even offer large-print or Spanish versions).

Do not forget to tell your doctor about all the medicines you are currently taking (not just those for pinworm infection). This includes prescription medicines and the medicines that you buy over the counter. Then your doctor can avoid giving you a new medicine that may not work well with the medications you take now. When talking to your doctor, you may wish to prepare a list of medicines you currently take, the reason you take them, and how you take them. Be sure to include the following information for each:

- Name of medicine
- Reason taken
- Dosage
- Time(s) of day

Also include any over-the-counter medicines, such as:

- Laxatives
- Diet pills
- Vitamins
- Cold medicine
- Aspirin or other pain, headache, or fever medicine
- Cough medicine
- Allergy relief medicine
- Antacids
- Sleeping pills
- Others (include names)

## Learning More about Your Medications

Because of historical investments by various organizations and the emergence of the Internet, it has become rather simple to learn about the medications your doctor has recommended for pinworm infection. One such source is the United States Pharmacopeia. In 1820, eleven physicians met in Washington, D.C. to establish the first compendium of standard drugs for the United States. They called this compendium the "U.S. Pharmacopeia (USP)." Today, the USP is a non-profit organization consisting of 800 volunteer scientists, eleven elected officials, and 400 representatives of state associations and colleges of medicine and pharmacy. The USP is located in Rockville, Maryland, and its home page is located at **www.usp.org**. The USP currently provides standards for over 3,700 medications. The resulting USP DI® Advice for the Patient® can be accessed through the National Library of Medicine of the National Institutes of Health. The database is partially derived from lists of federally approved medications in the Food and Drug Administration's (FDA) Drug Approvals database.[32]

While the FDA database is rather large and difficult to navigate, the Phamacopeia is both user-friendly and free to use. It covers more than 9,000 prescription and over-the-counter medications. To access this database, simply type the following hyperlink into your Web browser: **http://www.nlm.nih.gov/medlineplus/druginformation.html**. To view examples of a given medication (brand names, category, description, preparation, proper use, precautions, side effects, etc.), simply follow the hyperlinks indicated within the United States Pharmacopoeia (USP). It is important to read the disclaimer by the USP (**http://www.nlm.nih.gov/medlineplus/drugdisclaimer.html**) before using the information provided.

Of course, we as editors cannot be certain as to what medications you are taking. Therefore, we have compiled a list of medications associated with the treatment of pinworm infection. Once again, due to space limitations, we only list a sample of medications and provide hyperlinks to ample documentation (e.g. typical dosage, side effects, drug-interaction risks, etc.). The following drugs have been mentioned in the Pharmacopeia and other sources as being potentially applicable to pinworm infection:

[32] Though cumbersome, the FDA database can be freely browsed at the following site: **www.fda.gov/cder/da/da.htm**.

**Albendazole**

- **Systemic - U.S. Brands:** Albenza; Eskazole; Zentel
  http://www.nlm.nih.gov/medlineplus/druginfo/albendazolesystemic202668.html

**Mebendazole**

- **Systemic - U.S. Brands:** Vermox
  http://www.nlm.nih.gov/medlineplus/druginfo/mebendazolesystemic202339.html

**Pyrantel**

- **Oral - U.S. Brands:** Pin-X
  http://www.nlm.nih.gov/medlineplus/druginfo/pyranteloral202490.html

**Thiabendazole**

- **Systemic - U.S. Brands:** Mintezol
  http://www.nlm.nih.gov/medlineplus/druginfo/thiabendazolesystemic202558.html

## Commercial Databases

In addition to the medications listed in the USP above, a number of commercial sites are available by subscription to physicians and their institutions. You may be able to access these sources from your local medical library or your doctor's office.

### Reuters Health Drug Database

The Reuters Health Drug Database can be searched by keyword at the hyperlink: **http://www.reutershealth.com/frame2/drug.html**. The following medications are listed in the Reuters' database as associated with pinworm infection (including those with contraindications):[33]

- **Mebendazole**
  http://www.reutershealth.com/atoz/html/Mebendazole.htm
- **Thiabendazole**
  http://www.reutershealth.com/atoz/html/Thiabendazole.htm

[33] Adapted from *A to Z Drug Facts* by Facts and Comparisons.

### Mosby's GenRx

Mosby's GenRx database (also available on CD-Rom and book format) covers 45,000 drug products including generics and international brands. It provides prescribing information, drug interactions, and patient information. Information can be obtained at the following hyperlink: **http://www.genrx.com/Mosby/PhyGenRx/group.html**.

### Physicians Desk Reference

The Physicians Desk Reference database (also available in CD-Rom and book format) is a full-text drug database. The database is searchable by brand name, generic name or by indication. It features multiple drug interactions reports. Information can be obtained at the following hyperlink: **http://physician.pdr.net/physician/templates/en/acl/psuser_t.htm**.

### Other Web Sites

A number of additional Web sites discuss drug information. As an example, you may like to look at **www.drugs.com** which reproduces the information in the Pharmacopeia as well as commercial information. You may also want to consider the Web site of the Medical Letter, Inc. which allows users to download articles on various drugs and therapeutics for a nominal fee: **http://www.medletter.com/**.

## Contraindications and Interactions (Hidden Dangers)

Some of the medications mentioned in the previous discussions can be problematic for patients with pinworm infection--not because they are used in the treatment process, but because of contraindications, or side effects. Medications with contraindications are those that could react with drugs used to treat pinworm infection or potentially create deleterious side effects in patients with pinworm infection. You should ask your physician about any contraindications, especially as these might apply to other medications that you may be taking for common ailments.

Drug-drug interactions occur when two or more drugs react with each other. This drug-drug interaction may cause you to experience an unexpected side effect. Drug interactions may make your medications less effective, cause

unexpected side effects, or increase the action of a particular drug. Some drug interactions can even be harmful to you.

Be sure to read the label every time you use a nonprescription or prescription drug, and take the time to learn about drug interactions. These precautions may be critical to your health. You can reduce the risk of potentially harmful drug interactions and side effects with a little bit of knowledge and common sense.

Drug labels contain important information about ingredients, uses, warnings, and directions which you should take the time to read and understand. Labels also include warnings about possible drug interactions. Further, drug labels may change as new information becomes available. This is why it's especially important to read the label every time you use a medication. When your doctor prescribes a new drug, discuss all over-the-counter and prescription medications, dietary supplements, vitamins, botanicals, minerals and herbals you take as well as the foods you eat. Ask your pharmacist for the package insert for each prescription drug you take. The package insert provides more information about potential drug interactions.

## A Final Warning

At some point, you may hear of alternative medications from friends, relatives, or in the news media. Advertisements may suggest that certain alternative drugs can produce positive results for patients with pinworm infection. Exercise caution--some of these drugs may have fraudulent claims, and others may actually hurt you. The Food and Drug Administration (FDA) is the official U.S. agency charged with discovering which medications are likely to improve the health of patients with pinworm infection. The FDA warns patients to watch out for[34]:

- Secret formulas (real scientists share what they know)
- Amazing breakthroughs or miracle cures (real breakthroughs don't happen very often; when they do, real scientists do not call them amazing or miracles)
- Quick, painless, or guaranteed cures
- If it sounds too good to be true, it probably isn't true.

[34] This section has been adapted from **http://www.fda.gov/opacom/lowlit/medfraud.html**.

If you have any questions about any kind of medical treatment, the FDA may have an office near you. Look for their number in the blue pages of the phone book. You can also contact the FDA through its toll-free number, 1-888-INFO-FDA (1-888-463-6332), or on the World Wide Web at **www.fda.gov**.

## General References

In addition to the resources provided earlier in this chapter, the following general references describe medications (sorted alphabetically by title; hyperlinks provide rankings, information and reviews at Amazon.com):

- **Approaches to Design and Synthesis of Antiparasitic Drugs** by Satyavan Sharma, et al; Hardcover - 524 pages (October 1, 1997), Elsevier Science; ISBN: 0444894764; **http://www.amazon.com/exec/obidos/ASIN/0444894764/icongroupinterna**
- **Drug Interactions in Infectious Diseases (Infectious Disease)** by Stephen C. Piscitelli (Editor), et al; Hardcover - 372 pages (September 2000), Humana Press; ISBN: 0896037509; **http://www.amazon.com/exec/obidos/ASIN/0896037509/icongroupinterna**
- **Management of Antimicrobials in Infectious Diseases: Impact of Antibiotic Resistance** by Arch G. Mainous, Ph.D. (Editor), et al; Hardcover - 350 pages, 1st edition (January 15, 2001), Humana Press; ISBN: 0896038211; **http://www.amazon.com/exec/obidos/ASIN/0896038211/icongroupinterna**

# APPENDIX B. RESEARCHING NUTRITION

## Overview

Since the time of Hippocrates, doctors have understood the importance of diet and nutrition to patients' health and well-being. Since then, they have accumulated an impressive archive of studies and knowledge dedicated to this subject. Based on their experience, doctors and healthcare providers may recommend particular dietary supplements to patients with pinworm infection. Any dietary recommendation is based on a patient's age, body mass, gender, lifestyle, eating habits, food preferences, and health condition. It is therefore likely that different patients with pinworm infection may be given different recommendations. Some recommendations may be directly related to pinworm infection, while others may be more related to the patient's general health. These recommendations, themselves, may differ from what official sources recommend for the average person.

In this chapter we will begin by briefly reviewing the essentials of diet and nutrition that will broadly frame more detailed discussions of pinworm infection. We will then show you how to find studies dedicated specifically to nutrition and pinworm infection.

## Food and Nutrition: General Principles

### What Are Essential Foods?

Food is generally viewed by official sources as consisting of six basic elements: (1) fluids, (2) carbohydrates, (3) protein, (4) fats, (5) vitamins, and (6) minerals. Consuming a combination of these elements is considered to be a healthy diet:

- **Fluids** are essential to human life as 80-percent of the body is composed of water. Water is lost via urination, sweating, diarrhea, vomiting, diuretics (drugs that increase urination), caffeine, and physical exertion.
- **Carbohydrates** are the main source for human energy (thermoregulation) and the bulk of typical diets. They are mostly classified as being either simple or complex. Simple carbohydrates include sugars which are often consumed in the form of cookies, candies, or cakes. Complex carbohydrates consist of starches and dietary fibers. Starches are consumed in the form of pastas, breads, potatoes, rice, and other foods. Soluble fibers can be eaten in the form of certain vegetables, fruits, oats, and legumes. Insoluble fibers include brown rice, whole grains, certain fruits, wheat bran and legumes.
- **Proteins** are eaten to build and repair human tissues. Some foods that are high in protein are also high in fat and calories. Food sources for protein include nuts, meat, fish, cheese, and other dairy products.
- **Fats** are consumed for both energy and the absorption of certain vitamins. There are many types of fats, with many general publications recommending the intake of unsaturated fats or those low in cholesterol.

Vitamins and minerals are fundamental to human health, growth, and, in some cases, disease prevention. Most are consumed in your diet (exceptions being vitamins K and D which are produced by intestinal bacteria and sunlight on the skin, respectively). Each vitamin and mineral plays a different role in health. The following outlines essential vitamins:

- **Vitamin A** is important to the health of your eyes, hair, bones, and skin; sources of vitamin A include foods such as eggs, carrots, and cantaloupe.
- **Vitamin $B^1$**, also known as thiamine, is important for your nervous system and energy production; food sources for thiamine include meat, peas, fortified cereals, bread, and whole grains.
- **Vitamin $B^2$**, also known as riboflavin, is important for your nervous system and muscles, but is also involved in the release of proteins from

nutrients; food sources for riboflavin include dairy products, leafy vegetables, meat, and eggs.

- **Vitamin $B^3$**, also known as niacin, is important for healthy skin and helps the body use energy; food sources for niacin include peas, peanuts, fish, and whole grains
- **Vitamin $B^6$**, also known as pyridoxine, is important for the regulation of cells in the nervous system and is vital for blood formation; food sources for pyridoxine include bananas, whole grains, meat, and fish.
- **Vitamin $B^{12}$** is vital for a healthy nervous system and for the growth of red blood cells in bone marrow; food sources for vitamin $B^{12}$ include yeast, milk, fish, eggs, and meat.
- **Vitamin C** allows the body's immune system to fight various diseases, strengthens body tissue, and improves the body's use of iron; food sources for vitamin C include a wide variety of fruits and vegetables.
- **Vitamin D** helps the body absorb calcium which strengthens bones and teeth; food sources for vitamin D include oily fish and dairy products.
- **Vitamin E** can help protect certain organs and tissues from various degenerative diseases; food sources for vitamin E include margarine, vegetables, eggs, and fish.
- **Vitamin K** is essential for bone formation and blood clotting; common food sources for vitamin K include leafy green vegetables.
- **Folic Acid** maintains healthy cells and blood and, when taken by a pregnant woman, can prevent her fetus from developing neural tube defects; food sources for folic acid include nuts, fortified breads, leafy green vegetables, and whole grains.

It should be noted that one can overdose on certain vitamins which become toxic if consumed in excess (e.g. vitamin A, D, E and K).
Like vitamins, minerals are chemicals that are required by the body to remain in good health. Because the human body does not manufacture these chemicals internally, we obtain them from food and other dietary sources. The more important minerals include:

- **Calcium** is needed for healthy bones, teeth, and muscles, but also helps the nervous system function; food sources for calcium include dry beans, peas, eggs, and dairy products.
- **Chromium** is helpful in regulating sugar levels in blood; food sources for chromium include egg yolks, raw sugar, cheese, nuts, beets, whole grains, and meat.

- **Fluoride** is used by the body to help prevent tooth decay and to reinforce bone strength; sources of fluoride include drinking water and certain brands of toothpaste.
- **Iodine** helps regulate the body's use of energy by synthesizing into the hormone thyroxine; food sources include leafy green vegetables, nuts, egg yolks, and red meat.
- **Iron** helps maintain muscles and the formation of red blood cells and certain proteins; food sources for iron include meat, dairy products, eggs, and leafy green vegetables.
- **Magnesium** is important for the production of DNA, as well as for healthy teeth, bones, muscles, and nerves; food sources for magnesium include dried fruit, dark green vegetables, nuts, and seafood.
- **Phosphorous** is used by the body to work with calcium to form bones and teeth; food sources for phosphorous include eggs, meat, cereals, and dairy products.
- **Selenium** primarily helps maintain normal heart and liver functions; food sources for selenium include wholegrain cereals, fish, meat, and dairy products.
- **Zinc** helps wounds heal, the formation of sperm, and encourage rapid growth and energy; food sources include dried beans, shellfish, eggs, and nuts.

The United States government periodically publishes recommended diets and consumption levels of the various elements of food. Again, your doctor may encourage deviations from the average official recommendation based on your specific condition. To learn more about basic dietary guidelines, visit the Web site: **http://www.health.gov/dietaryguidelines/**. Based on these guidelines, many foods are required to list the nutrition levels on the food's packaging. Labeling Requirements are listed at the following site maintained by the Food and Drug Administration: **http://www.cfsan.fda.gov/~dms/lab-cons.html**. When interpreting these requirements, the government recommends that consumers become familiar with the following abbreviations before reading FDA literature:[35]

- **DVs (Daily Values):** A new dietary reference term that will appear on the food label. It is made up of two sets of references, DRVs and RDIs.
- **DRVs (Daily Reference Values):** A set of dietary references that applies to fat, saturated fat, cholesterol, carbohydrate, protein, fiber, sodium, and potassium.

[35] Adapted from the FDA: **http://www.fda.gov/fdac/special/foodlabel/dvs.html**.

- **RDIs (Reference Daily Intakes):** A set of dietary references based on the Recommended Dietary Allowances for essential vitamins and minerals and, in selected groups, protein. The name "RDI" replaces the term "U.S. RDA."
- **RDAs (Recommended Dietary Allowances):** A set of estimated nutrient allowances established by the National Academy of Sciences. It is updated periodically to reflect current scientific knowledge.

### What Are Dietary Supplements?[36]

Dietary supplements are widely available through many commercial sources, including health food stores, grocery stores, pharmacies, and by mail. Dietary supplements are provided in many forms including tablets, capsules, powders, gel-tabs, extracts, and liquids. Historically in the United States, the most prevalent type of dietary supplement was a multivitamin/mineral tablet or capsule that was available in pharmacies, either by prescription or "over the counter." Supplements containing strictly herbal preparations were less widely available. Currently in the United States, a wide array of supplement products are available, including vitamin, mineral, other nutrients, and botanical supplements as well as ingredients and extracts of animal and plant origin.

The Office of Dietary Supplements (ODS) of the National Institutes of Health is the official agency of the United States which has the expressed goal of acquiring "new knowledge to help prevent, detect, diagnose, and treat disease and disability, from the rarest genetic disorder to the common cold."[37] According to the ODS, dietary supplements can have an important impact on the prevention and management of disease and on the maintenance of health.[38] The ODS notes that considerable research on the effects of dietary supplements has been conducted in Asia and Europe where

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[36] This discussion has been adapted from the NIH: **http://ods.od.nih.gov/whatare/whatare.html**.

[37] Contact: The Office of Dietary Supplements, National Institutes of Health, Building 31, Room 1B29, 31 Center Drive, MSC 2086, Bethesda, Maryland 20892-2086, Tel: (301) 435-2920, Fax: (301) 480-1845, E-mail: **ods@nih.gov**.

[38] Adapted from **http://ods.od.nih.gov/about/about.html**. The Dietary Supplement Health and Education Act defines dietary supplements as "a product (other than tobacco) intended to supplement the diet that bears or contains one or more of the following dietary ingredients: a vitamin, mineral, amino acid, herb or other botanical; or a dietary substance for use to supplement the diet by increasing the total dietary intake; or a concentrate, metabolite, constituent, extract, or combination of any ingredient described above; and intended for ingestion in the form of a capsule, powder, softgel, or gelcap, and not represented as a conventional food or as a sole item of a meal or the diet."

the use of plant products, in particular, has a long tradition. However, the overwhelming majority of supplements have not been studied scientifically. To explore the role of dietary supplements in the improvement of health care, the ODS plans, organizes, and supports conferences, workshops, and symposia on scientific topics related to dietary supplements. The ODS often works in conjunction with other NIH Institutes and Centers, other government agencies, professional organizations, and public advocacy groups.

To learn more about official information on dietary supplements, visit the ODS site at **http://ods.od.nih.gov/whatare/whatare.html**. Or contact:

The Office of Dietary Supplements
National Institutes of Health
Building 31, Room 1B29
31 Center Drive, MSC 2086
Bethesda, Maryland 20892-2086
Tel: (301) 435-2920
Fax: (301) 480-1845
E-mail: ods@nih.gov

## Finding Studies on Pinworm Infection

The NIH maintains an office dedicated to patient nutrition and diet. The National Institutes of Health's Office of Dietary Supplements (ODS) offers a searchable bibliographic database called the IBIDS (International Bibliographic Information on Dietary Supplements). The IBIDS contains over 460,000 scientific citations and summaries about dietary supplements and nutrition as well as references to published international, scientific literature on dietary supplements such as vitamins, minerals, and botanicals.[39] IBIDS is available to the public free of charge through the ODS Internet page: **http://ods.od.nih.gov/databases/ibids.html**.

After entering the search area, you have three choices: (1) IBIDS Consumer Database, (2) Full IBIDS Database, or (3) Peer Reviewed Citations Only. We recommend that you start with the Consumer Database. While you may not find references for the topics that are of most interest to you, check back

[39] Adapted from **http://ods.od.nih.gov**. IBIDS is produced by the Office of Dietary Supplements (ODS) at the National Institutes of Health to assist the public, healthcare providers, educators, and researchers in locating credible, scientific information on dietary supplements. IBIDS was developed and will be maintained through an interagency partnership with the Food and Nutrition Information Center of the National Agricultural Library, U.S. Department of Agriculture.

periodically as this database is frequently updated. More studies can be found by searching the Full IBIDS Database. Healthcare professionals and researchers generally use the third option, which lists peer-reviewed citations. In all cases, we suggest that you take advantage of the "Advanced Search" option that allows you to retrieve up to 100 fully explained references in a comprehensive format. Type "pinworm infection" (or synonyms) into the search box. To narrow the search, you can also select the "Title" field.

The following information is typical of that found when using the "Full IBIDS Database" when searching using "pinworm infection" (or a synonym):

- **An oral ivermectin regimen that eradicates pinworms (Syphacia spp.) in laboratory rats and mice.**
  Author(s): Hamilton Civic Hospitals Research Centre, Ontario, Canada.
  Source: Klement, P Augustine, J M Delaney, K H Klement, G Weitz, J I Lab-Anim-Sci. 1996 June; 46(3): 286-90 0023-6764
- **Comparison of practical treatment methods to eradicate pinworm (Dentostomella translucida) infections from Mongolian gerbils (Meroines unguiculatus).**
  Author(s): Laboratory Animal Resource Center, University of California, Medical Research Building II, Box 0564, San Francisco, California 94143-0564, USA.
  Source: Wilkerson, J D Brooks, D L Derby, M Griffey, S M Contemp-Top-Lab-Anim-Sci. 2001 September; 40(5): 31-6 1060-0558
- **Effective eradication of pinworms (Syphaciamuris, Syphacia obvelata and Aspiculuris tetraptera) from a rodent breeding colony by oral anthelmintic therapy.**
  Author(s): CDTA (Centre de Development des Techniques Avancees pour l'Experimentation Animale), Unite CNRS UPS44, Orleans, France.
  Source: Zenner, L Lab-Anim. 1998 July; 32(3): 337-42 0023-6772
- **Eradication of pinworms (Syphacia obvelata) from a large mouse breeding colony by combination oral anthelmintic therapy.**
  Author(s): Division of Comparative, Massachusetts Institute of Technology, Cambridge 02139.
  Source: Lipman, N S Dalton, S D Stuart, A R Arruda, K Lab-Anim-Sci. 1994 October; 44(5): 517-20 0023-6764
- **Ivermectin eradication of pinworms from rats kept in ventilated cages.**
  Author(s): Division of Animal Resources, Emory University School of Medicine, Atlanta, GA 30322.
  Source: Huerkamp, M J Lab-Anim-Sci. 1993 February; 43(1): 86-90 0023-6764

- **Toxicity evaluation of prophylactic treatments for mites and pinworms in mice.**
  Author(s): Animal Resources Center, St. Jude Children's Research Hospital, Memphis, TN 38105, USA.
  Source: Toth, L A Oberbeck, C Straign, C M Frazier, S Rehg, J E Contemp-Top-Lab-Anim-Sci. 2000 March; 39(2): 18-21 1060-0558

## Federal Resources on Nutrition

In addition to the IBIDS, the United States Department of Health and Human Services (HHS) and the United States Department of Agriculture (USDA) provide many sources of information on general nutrition and health. Recommended resources include:

- healthfinder®, HHS's gateway to health information, including diet and nutrition:
  **http://www.healthfinder.gov/scripts/SearchContext.asp?topic=238&page=0**
- The United States Department of Agriculture's Web site dedicated to nutrition information: **www.nutrition.gov**
- The Food and Drug Administration's Web site for federal food safety information: **www.foodsafety.gov**
- The National Action Plan on Overweight and Obesity sponsored by the United States Surgeon General:
  **http://www.surgeongeneral.gov/topics/obesity/**
- The Center for Food Safety and Applied Nutrition has an Internet site sponsored by the Food and Drug Administration and the Department of Health and Human Services: **http://vm.cfsan.fda.gov/**
- Center for Nutrition Policy and Promotion sponsored by the United States Department of Agriculture: **http://www.usda.gov/cnpp/**
- Food and Nutrition Information Center, National Agricultural Library sponsored by the United States Department of Agriculture: **http://www.nal.usda.gov/fnic/**
- Food and Nutrition Service sponsored by the United States Department of Agriculture: **http://www.fns.usda.gov/fns/**

## Additional Web Resources

A number of additional Web sites offer encyclopedic information covering food and nutrition. The following is a representative sample:

- AOL: **http://search.aol.com/cat.adp?id=174&layer=&from=subcats**
- Family Village: **http://www.familyvillage.wisc.edu/med_nutrition.html**
- Google: **http://directory.google.com/Top/Health/Nutrition/**
- Healthnotes: **http://www.thedacare.org/healthnotes/**
- Open Directory Project: **http://dmoz.org/Health/Nutrition/**
- Yahoo.com: **http://dir.yahoo.com/Health/Nutrition/**
- WebMD®Health: **http://my.webmd.com/nutrition**
- WholeHealthMD.com: **http://www.wholehealthmd.com/reflib/0,1529,,00.html**

## Vocabulary Builder

The following vocabulary builder defines words used in the references in this chapter that have not been defined in previous chapters:

**Antimicrobial:** Killing microorganisms, or suppressing their multiplication or growth. [EU]

**Mebendazole:** A nematocide in humans and animals. It acts by interfering with the carbohydrate metabolism and associated energy production of the parasite. [NIH]

**Systemic:** Pertaining to or affecting the body as a whole. [EU]

# APPENDIX C. FINDING MEDICAL LIBRARIES

## Overview

At a medical library you can find medical texts and reference books, consumer health publications, specialty newspapers and magazines, as well as medical journals. In this Appendix, we show you how to quickly find a medical library in your area.

## Preparation

Before going to the library, highlight the references mentioned in this sourcebook that you find interesting. Focus on those items that are not available via the Internet, and ask the reference librarian for help with your search. He or she may know of additional resources that could be helpful to you. Most importantly, your local public library and medical libraries have Interlibrary Loan programs with the National Library of Medicine (NLM), one of the largest medical collections in the world. According to the NLM, most of the literature in the general and historical collections of the National Library of Medicine is available on interlibrary loan to any library. NLM's interlibrary loan services are only available to libraries. If you would like to access NLM medical literature, then visit a library in your area that can request the publications for you.[40]

[40] Adapted from the NLM: **http://www.nlm.nih.gov/psd/cas/interlibrary.html**.

## Finding a Local Medical Library

The quickest method to locate medical libraries is to use the Internet-based directory published by the National Network of Libraries of Medicine (NN/LM). This network includes 4626 members and affiliates that provide many services to librarians, health professionals, and the public. To find a library in your area, simply visit **http://nnlm.gov/members/adv.html** or call 1-800-338-7657.

## Medical Libraries Open to the Public

In addition to the NN/LM, the National Library of Medicine (NLM) lists a number of libraries that are generally open to the public and have reference facilities. The following is the NLM's list plus hyperlinks to each library Web site. These Web pages can provide information on hours of operation and other restrictions. The list below is a small sample of libraries recommended by the National Library of Medicine (sorted alphabetically by name of the U.S. state or Canadian province where the library is located):[41]

- **Alabama:** Health InfoNet of Jefferson County (Jefferson County Library Cooperative, Lister Hill Library of the Health Sciences), **http://www.uab.edu/infonet/**
- **Alabama:** Richard M. Scrushy Library (American Sports Medicine Institute), **http://www.asmi.org/LIBRARY.HTM**
- **Arizona:** Samaritan Regional Medical Center: The Learning Center (Samaritan Health System, Phoenix, Arizona), **http://www.samaritan.edu/library/bannerlibs.htm**
- **California:** Kris Kelly Health Information Center (St. Joseph Health System), **http://www.humboldt1.com/~kkhic/index.html**
- **California:** Community Health Library of Los Gatos (Community Health Library of Los Gatos), **http://www.healthlib.org/orgresources.html**
- **California:** Consumer Health Program and Services (CHIPS) (County of Los Angeles Public Library, Los Angeles County Harbor-UCLA Medical Center Library) - Carson, CA, **http://www.colapublib.org/services/chips.html**
- **California:** Gateway Health Library (Sutter Gould Medical Foundation)
- **California:** Health Library (Stanford University Medical Center), **http://www-med.stanford.edu/healthlibrary/**

[41] Abstracted from **http://www.nlm.nih.gov/medlineplus/libraries.html**.

- **California:** Patient Education Resource Center - Health Information and Resources (University of California, San Francisco), **http://sfghdean.ucsf.edu/barnett/PERC/default.asp**
- **California:** Redwood Health Library (Petaluma Health Care District), **http://www.phcd.org/rdwdlib.html**
- **California:** San José PlaneTree Health Library, **http://planetreesanjose.org/**
- **California:** Sutter Resource Library (Sutter Hospitals Foundation), **http://go.sutterhealth.org/comm/resc-library/sac-resources.html**
- **California:** University of California, Davis. Health Sciences Libraries
- **California:** ValleyCare Health Library & Ryan Comer Cancer Resource Center (ValleyCare Health System), **http://www.valleycare.com/library.html**
- **California:** Washington Community Health Resource Library (Washington Community Health Resource Library), **http://www.healthlibrary.org/**
- **Colorado:** William V. Gervasini Memorial Library (Exempla Healthcare), **http://www.exempla.org/conslib.htm**
- **Connecticut:** Hartford Hospital Health Science Libraries (Hartford Hospital), **http://www.harthosp.org/library/**
- **Connecticut:** Healthnet: Connecticut Consumer Health Information Center (University of Connecticut Health Center, Lyman Maynard Stowe Library), **http://library.uchc.edu/departm/hnet/**
- **Connecticut:** Waterbury Hospital Health Center Library (Waterbury Hospital), **http://www.waterburyhospital.com/library/consumer.shtml**
- **Delaware:** Consumer Health Library (Christiana Care Health System, Eugene du Pont Preventive Medicine & Rehabilitation Institute), **http://www.christianacare.org/health_guide/health_guide_pmri_health_info.cfm**
- **Delaware:** Lewis B. Flinn Library (Delaware Academy of Medicine), **http://www.delamed.org/chls.html**
- **Georgia:** Family Resource Library (Medical College of Georgia), **http://cmc.mcg.edu/kids_families/fam_resources/fam_res_lib/frl.htm**
- **Georgia:** Health Resource Center (Medical Center of Central Georgia), **http://www.mccg.org/hrc/hrchome.asp**
- **Hawaii:** Hawaii Medical Library: Consumer Health Information Service (Hawaii Medical Library), **http://hml.org/CHIS/**

- **Idaho:** DeArmond Consumer Health Library (Kootenai Medical Center), **http://www.nicon.org/DeArmond/index.htm**
- **Illinois:** Health Learning Center of Northwestern Memorial Hospital (Northwestern Memorial Hospital, Health Learning Center), **http://www.nmh.org/health_info/hlc.html**
- **Illinois:** Medical Library (OSF Saint Francis Medical Center), **http://www.osfsaintfrancis.org/general/library/**
- **Kentucky:** Medical Library - Services for Patients, Families, Students & the Public (Central Baptist Hospital), **http://www.centralbap.com/education/community/library.htm**
- **Kentucky:** University of Kentucky - Health Information Library (University of Kentucky, Chandler Medical Center, Health Information Library), **http://www.mc.uky.edu/PatientEd/**
- **Louisiana:** Alton Ochsner Medical Foundation Library (Alton Ochsner Medical Foundation), **http://www.ochsner.org/library/**
- **Louisiana:** Louisiana State University Health Sciences Center Medical Library-Shreveport, **http://lib-sh.lsuhsc.edu/**
- **Maine:** Franklin Memorial Hospital Medical Library (Franklin Memorial Hospital), **http://www.fchn.org/fmh/lib.htm**
- **Maine:** Gerrish-True Health Sciences Library (Central Maine Medical Center), **http://www.cmmc.org/library/library.html**
- **Maine:** Hadley Parrot Health Science Library (Eastern Maine Healthcare), **http://www.emh.org/hll/hpl/guide.htm**
- **Maine:** Maine Medical Center Library (Maine Medical Center), **http://www.mmc.org/library/**
- **Maine:** Parkview Hospital, **http://www.parkviewhospital.org/communit.htm#Library**
- **Maine:** Southern Maine Medical Center Health Sciences Library (Southern Maine Medical Center), **http://www.smmc.org/services/service.php3?choice=10**
- **Maine:** Stephens Memorial Hospital Health Information Library (Western Maine Health), **http://www.wmhcc.com/hil_frame.html**
- **Manitoba, Canada:** Consumer & Patient Health Information Service (University of Manitoba Libraries), **http://www.umanitoba.ca/libraries/units/health/reference/chis.html**
- **Manitoba, Canada:** J.W. Crane Memorial Library (Deer Lodge Centre), **http://www.deerlodge.mb.ca/library/libraryservices.shtml**

- **Maryland:** Health Information Center at the Wheaton Regional Library (Montgomery County, Md., Dept. of Public Libraries, Wheaton Regional Library), **http://www.mont.lib.md.us/healthinfo/hic.asp**
- **Massachusetts:** Baystate Medical Center Library (Baystate Health System), **http://www.baystatehealth.com/1024/**
- **Massachusetts:** Boston University Medical Center Alumni Medical Library (Boston University Medical Center), **http://med-libwww.bu.edu/library/lib.html**
- **Massachusetts:** Lowell General Hospital Health Sciences Library (Lowell General Hospital), **http://www.lowellgeneral.org/library/HomePageLinks/WWW.htm**
- **Massachusetts:** Paul E. Woodard Health Sciences Library (New England Baptist Hospital), **http://www.nebh.org/health_lib.asp**
- **Massachusetts:** St. Luke's Hospital Health Sciences Library (St. Luke's Hospital), **http://www.southcoast.org/library/**
- **Massachusetts:** Treadwell Library Consumer Health Reference Center (Massachusetts General Hospital), **http://www.mgh.harvard.edu/library/chrcindex.html**
- **Massachusetts:** UMass HealthNet (University of Massachusetts Medical School), **http://healthnet.umassmed.edu/**
- **Michigan:** Botsford General Hospital Library - Consumer Health (Botsford General Hospital, Library & Internet Services), **http://www.botsfordlibrary.org/consumer.htm**
- **Michigan:** Helen DeRoy Medical Library (Providence Hospital and Medical Centers), **http://www.providence-hospital.org/library/**
- **Michigan:** Marquette General Hospital - Consumer Health Library (Marquette General Hospital, Health Information Center), **http://www.mgh.org/center.html**
- **Michigan:** Patient Education Resouce Center - University of Michigan Cancer Center (University of Michigan Comprehensive Cancer Center), **http://www.cancer.med.umich.edu/learn/leares.htm**
- **Michigan:** Sladen Library & Center for Health Information Resources - Consumer Health Information, **http://www.sladen.hfhs.org/library/consumer/index.html**
- **Montana:** Center for Health Information (St. Patrick Hospital and Health Sciences Center), **http://www.saintpatrick.org/chi/librarydetail.php3?ID=41**

- **National:** Consumer Health Library Directory (Medical Library Association, Consumer and Patient Health Information Section), **http://caphis.mlanet.org/directory/index.html**
- **National:** National Network of Libraries of Medicine (National Library of Medicine) - provides library services for health professionals in the United States who do not have access to a medical library, **http://nnlm.gov/**
- **National:** NN/LM List of Libraries Serving the Public (National Network of Libraries of Medicine), **http://nnlm.gov/members/**
- **Nevada:** Health Science Library, West Charleston Library (Las Vegas Clark County Library District), **http://www.lvccld.org/special_collections/medical/index.htm**
- **New Hampshire:** Dartmouth Biomedical Libraries (Dartmouth College Library), **http://www.dartmouth.edu/~biomed/resources.htmld/conshealth.htmld/**
- **New Jersey:** Consumer Health Library (Rahway Hospital), **http://www.rahwayhospital.com/library.htm**
- **New Jersey:** Dr. Walter Phillips Health Sciences Library (Englewood Hospital and Medical Center), **http://www.englewoodhospital.com/links/index.htm**
- **New Jersey:** Meland Foundation (Englewood Hospital and Medical Center), **http://www.geocities.com/ResearchTriangle/9360/**
- **New York:** Choices in Health Information (New York Public Library) - NLM Consumer Pilot Project participant, **http://www.nypl.org/branch/health/links.html**
- **New York:** Health Information Center (Upstate Medical University, State University of New York), **http://www.upstate.edu/library/hic/**
- **New York:** Health Sciences Library (Long Island Jewish Medical Center), **http://www.lij.edu/library/library.html**
- **New York:** ViaHealth Medical Library (Rochester General Hospital), **http://www.nyam.org/library/**
- **Ohio:** Consumer Health Library (Akron General Medical Center, Medical & Consumer Health Library), **http://www.akrongeneral.org/hwlibrary.htm**
- **Oklahoma:** Saint Francis Health System Patient/Family Resource Center (Saint Francis Health System), **http://www.sfh-tulsa.com/patientfamilycenter/default.asp**

- **Oregon:** Planetree Health Resource Center (Mid-Columbia Medical Center), **http://www.mcmc.net/phrc/**
- **Pennsylvania:** Community Health Information Library (Milton S. Hershey Medical Center), **http://www.hmc.psu.edu/commhealth/**
- **Pennsylvania:** Community Health Resource Library (Geisinger Medical Center), **http://www.geisinger.edu/education/commlib.shtml**
- **Pennsylvania:** HealthInfo Library (Moses Taylor Hospital), **http://www.mth.org/healthwellness.html**
- **Pennsylvania:** Hopwood Library (University of Pittsburgh, Health Sciences Library System), **http://www.hsls.pitt.edu/chi/hhrcinfo.html**
- **Pennsylvania:** Koop Community Health Information Center (College of Physicians of Philadelphia), **http://www.collphyphil.org/kooppg1.shtml**
- **Pennsylvania:** Learning Resources Center - Medical Library (Susquehanna Health System), **http://www.shscares.org/services/lrc/index.asp**
- **Pennsylvania:** Medical Library (UPMC Health System), **http://www.upmc.edu/passavant/library.htm**
- **Quebec, Canada:** Medical Library (Montreal General Hospital), **http://ww2.mcgill.ca/mghlib/**
- **South Dakota:** Rapid City Regional Hospital - Health Information Center (Rapid City Regional Hospital, Health Information Center), **http://www.rcrh.org/education/LibraryResourcesConsumers.htm**
- **Texas:** Houston HealthWays (Houston Academy of Medicine-Texas Medical Center Library), **http://hhw.library.tmc.edu/**
- **Texas:** Matustik Family Resource Center (Cook Children's Health Care System), **http://www.cookchildrens.com/Matustik_Library.html**
- **Washington:** Community Health Library (Kittitas Valley Community Hospital), **http://www.kvch.com/**
- **Washington:** Southwest Washington Medical Center Library (Southwest Washington Medical Center), **http://www.swmedctr.com/Home/**

# APPENDIX D. YOUR RIGHTS AND INSURANCE

## Overview

Any patient with pinworm infection faces a series of issues related more to the healthcare industry than to the medical condition itself. This appendix covers two important topics in this regard: your rights and responsibilities as a patient, and how to get the most out of your medical insurance plan.

## Your Rights as a Patient

The President's Advisory Commission on Consumer Protection and Quality in the Healthcare Industry has created the following summary of your rights as a patient.[42]

### Information Disclosure

Consumers have the right to receive accurate, easily understood information. Some consumers require assistance in making informed decisions about health plans, health professionals, and healthcare facilities. Such information includes:

- ***Health plans.*** Covered benefits, cost-sharing, and procedures for resolving complaints, licensure, certification, and accreditation status, comparable measures of quality and consumer satisfaction, provider network composition, the procedures that govern access to specialists and emergency services, and care management information.

[42]Adapted from Consumer Bill of Rights and Responsibilities: **http://www.hcqualitycommission.gov/press/cbor.html#head1**.

- ***Health professionals.*** Education, board certification, and recertification, years of practice, experience performing certain procedures, and comparable measures of quality and consumer satisfaction.
- ***Healthcare facilities.*** Experience in performing certain procedures and services, accreditation status, comparable measures of quality, worker, and consumer satisfaction, and procedures for resolving complaints.
- ***Consumer assistance programs.*** Programs must be carefully structured to promote consumer confidence and to work cooperatively with health plans, providers, payers, and regulators. Desirable characteristics of such programs are sponsorship that ensures accountability to the interests of consumers and stable, adequate funding.

### Choice of Providers and Plans

Consumers have the right to a choice of healthcare providers that is sufficient to ensure access to appropriate high-quality healthcare. To ensure such choice, the Commission recommends the following:

- ***Provider network adequacy.*** All health plan networks should provide access to sufficient numbers and types of providers to assure that all covered services will be accessible without unreasonable delay -- including access to emergency services 24 hours a day and 7 days a week. If a health plan has an insufficient number or type of providers to provide a covered benefit with the appropriate degree of specialization, the plan should ensure that the consumer obtains the benefit outside the network at no greater cost than if the benefit were obtained from participating providers.
- ***Women's health services.*** Women should be able to choose a qualified provider offered by a plan -- such as gynecologists, certified nurse midwives, and other qualified healthcare providers -- for the provision of covered care necessary to provide routine and preventative women's healthcare services.
- ***Access to specialists.*** Consumers with complex or serious medical conditions who require frequent specialty care should have direct access to a qualified specialist of their choice within a plan's network of providers. Authorizations, when required, should be for an adequate number of direct access visits under an approved treatment plan.
- ***Transitional care.*** Consumers who are undergoing a course of treatment for a chronic or disabling condition (or who are in the second or third trimester of a pregnancy) at the time they involuntarily change health

plans or at a time when a provider is terminated by a plan for other than cause should be able to continue seeing their current specialty providers for up to 90 days (or through completion of postpartum care) to allow for transition of care.

- ***Choice of health plans.*** Public and private group purchasers should, wherever feasible, offer consumers a choice of high-quality health insurance plans.

### Access to Emergency Services

Consumers have the right to access emergency healthcare services when and where the need arises. Health plans should provide payment when a consumer presents to an emergency department with acute symptoms of sufficient severity--including severe pain--such that a "prudent layperson" could reasonably expect the absence of medical attention to result in placing that consumer's health in serious jeopardy, serious impairment to bodily functions, or serious dysfunction of any bodily organ or part.

### Participation in Treatment Decisions

Consumers have the right and responsibility to fully participate in all decisions related to their healthcare. Consumers who are unable to fully participate in treatment decisions have the right to be represented by parents, guardians, family members, or other conservators. Physicians and other health professionals should:

- Provide patients with sufficient information and opportunity to decide among treatment options consistent with the informed consent process.
- Discuss all treatment options with a patient in a culturally competent manner, including the option of no treatment at all.
- Ensure that persons with disabilities have effective communications with members of the health system in making such decisions.
- Discuss all current treatments a consumer may be undergoing.
- Discuss all risks, benefits, and consequences to treatment or nontreatment.
- Give patients the opportunity to refuse treatment and to express preferences about future treatment decisions.

- Discuss the use of advance directives -- both living wills and durable powers of attorney for healthcare -- with patients and their designated family members.
- Abide by the decisions made by their patients and/or their designated representatives consistent with the informed consent process.

Health plans, health providers, and healthcare facilities should:

- Disclose to consumers factors -- such as methods of compensation, ownership of or interest in healthcare facilities, or matters of conscience -- that could influence advice or treatment decisions.
- Assure that provider contracts do not contain any so-called "gag clauses" or other contractual mechanisms that restrict healthcare providers' ability to communicate with and advise patients about medically necessary treatment options.
- Be prohibited from penalizing or seeking retribution against healthcare professionals or other health workers for advocating on behalf of their patients.

### Respect and Nondiscrimination

Consumers have the right to considerate, respectful care from all members of the healthcare industry at all times and under all circumstances. An environment of mutual respect is essential to maintain a quality healthcare system. To assure that right, the Commission recommends the following:

- Consumers must not be discriminated against in the delivery of healthcare services consistent with the benefits covered in their policy, or as required by law, based on race, ethnicity, national origin, religion, sex, age, mental or physical disability, sexual orientation, genetic information, or source of payment.
- Consumers eligible for coverage under the terms and conditions of a health plan or program, or as required by law, must not be discriminated against in marketing and enrollment practices based on race, ethnicity, national origin, religion, sex, age, mental or physical disability, sexual orientation, genetic information, or source of payment.

### Confidentiality of Health Information

Consumers have the right to communicate with healthcare providers in confidence and to have the confidentiality of their individually identifiable

healthcare information protected. Consumers also have the right to review and copy their own medical records and request amendments to their records.

### Complaints and Appeals

Consumers have the right to a fair and efficient process for resolving differences with their health plans, healthcare providers, and the institutions that serve them, including a rigorous system of internal review and an independent system of external review. A free copy of the Patient's Bill of Rights is available from the American Hospital Association.[43]

## Patient Responsibilities

Treatment is a two-way street between you and your healthcare providers. To underscore the importance of finance in modern healthcare as well as your responsibility for the financial aspects of your care, the President's Advisory Commission on Consumer Protection and Quality in the Healthcare Industry has proposed that patients understand the following "Consumer Responsibilities."[44] In a healthcare system that protects consumers' rights, it is reasonable to expect and encourage consumers to assume certain responsibilities. Greater individual involvement by the consumer in his or her care increases the likelihood of achieving the best outcome and helps support a quality-oriented, cost-conscious environment. Such responsibilities include:

- Take responsibility for maximizing healthy habits such as exercising, not smoking, and eating a healthy diet.
- Work collaboratively with healthcare providers in developing and carrying out agreed-upon treatment plans.
- Disclose relevant information and clearly communicate wants and needs.
- Use your health insurance plan's internal complaint and appeal processes to address your concerns.
- Avoid knowingly spreading disease.

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[43] To order your free copy of the Patient's Bill of Rights, telephone 312-422-3000 or visit the American Hospital Association's Web site: **http://www.aha.org**. Click on "Resource Center," go to "Search" at bottom of page, and then type in "Patient's Bill of Rights." The Patient's Bill of Rights is also available from Fax on Demand, at 312-422-2020, document number 471124.

[44] Adapted from **http://www.hcqualitycommission.gov/press/cbor.html#head1**.

- Recognize the reality of risks, the limits of the medical science, and the human fallibility of the healthcare professional.
- Be aware of a healthcare provider's obligation to be reasonably efficient and equitable in providing care to other patients and the community.
- Become knowledgeable about your health plan's coverage and options (when available) including all covered benefits, limitations, and exclusions, rules regarding use of network providers, coverage and referral rules, appropriate processes to secure additional information, and the process to appeal coverage decisions.
- Show respect for other patients and health workers.
- Make a good-faith effort to meet financial obligations.
- Abide by administrative and operational procedures of health plans, healthcare providers, and Government health benefit programs.

## Choosing an Insurance Plan

There are a number of official government agencies that help consumers understand their healthcare insurance choices.[45] The U.S. Department of Labor, in particular, recommends ten ways to make your health benefits choices work best for you.[46]

**1. Your options are important.** There are many different types of health benefit plans. Find out which one your employer offers, then check out the plan, or plans, offered. Your employer's human resource office, the health plan administrator, or your union can provide information to help you match your needs and preferences with the available plans. The more information you have, the better your healthcare decisions will be.

**2. Reviewing the benefits available.** Do the plans offered cover preventive care, well-baby care, vision or dental care? Are there deductibles? Answers to these questions can help determine the out-of-pocket expenses you may face. Matching your needs and those of your family members will result in the best possible benefits. Cheapest may not always be best. Your goal is high quality health benefits.

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[45] More information about quality across programs is provided at the following AHRQ Web site:
**http://www.ahrq.gov/consumer/qntascii/qnthplan.htm**.

[46] Adapted from the Department of Labor:
**http://www.dol.gov/dol/pwba/public/pubs/health/top10-text.html**.

**3. Look for quality.** The quality of healthcare services varies, but quality can be measured. You should consider the quality of healthcare in deciding among the healthcare plans or options available to you. Not all health plans, doctors, hospitals and other providers give the highest quality care. Fortunately, there is quality information you can use right now to help you compare your healthcare choices. Find out how you can measure quality. Consult the U.S. Department of Health and Human Services publication "Your Guide to Choosing Quality Health Care" on the Internet at **www.ahcpr.gov/consumer**.

**4. Your plan's summary plan description (SPD) provides a wealth of information.** Your health plan administrator can provide you with a copy of your plan's SPD. It outlines your benefits and your legal rights under the Employee Retirement Income Security Act (ERISA), the federal law that protects your health benefits. It should contain information about the coverage of dependents, what services will require a co-pay, and the circumstances under which your employer can change or terminate a health benefits plan. Save the SPD and all other health plan brochures and documents, along with memos or correspondence from your employer relating to health benefits.

**5. Assess your benefit coverage as your family status changes.** Marriage, divorce, childbirth or adoption, and the death of a spouse are all life events that may signal a need to change your health benefits. You, your spouse and dependent children may be eligible for a special enrollment period under provisions of the Health Insurance Portability and Accountability Act (HIPAA). Even without life-changing events, the information provided by your employer should tell you how you can change benefits or switch plans, if more than one plan is offered. If your spouse's employer also offers a health benefits package, consider coordinating both plans for maximum coverage.

**6. Changing jobs and other life events can affect your health benefits.** Under the Consolidated Omnibus Budget Reconciliation Act (COBRA), you, your covered spouse, and your dependent children may be eligible to purchase extended health coverage under your employer's plan if you lose your job, change employers, get divorced, or upon occurrence of certain other events. Coverage can range from 18 to 36 months depending on your situation. COBRA applies to most employers with 20 or more workers and requires your plan to notify you of your rights. Most plans require eligible individuals to make their COBRA election within 60 days of the plan's notice. Be sure to follow up with your plan sponsor if you don't receive notice, and make sure you respond within the allotted time.

**7. HIPAA can also help if you are changing jobs, particularly if you have a medical condition.** HIPAA generally limits pre-existing condition exclusions to a maximum of 12 months (18 months for late enrollees). HIPAA also requires this maximum period to be reduced by the length of time you had prior "creditable coverage." You should receive a certificate documenting your prior creditable coverage from your old plan when coverage ends.

**8. Plan for retirement.** Before you retire, find out what health benefits, if any, extend to you and your spouse during your retirement years. Consult with your employer's human resources office, your union, the plan administrator, and check your SPD. Make sure there is no conflicting information among these sources about the benefits you will receive or the circumstances under which they can change or be eliminated. With this information in hand, you can make other important choices, like finding out if you are eligible for Medicare and Medigap insurance coverage.

**9. Know how to file an appeal if your health benefits claim is denied.** Understand how your plan handles grievances and where to make appeals of the plan's decisions. Keep records and copies of correspondence. Check your health benefits package and your SPD to determine who is responsible for handling problems with benefit claims. Contact PWBA for customer service assistance if you are unable to obtain a response to your complaint.

**10. You can take steps to improve the quality of the healthcare and the health benefits you receive.** Look for and use things like Quality Reports and Accreditation Reports whenever you can. Quality reports may contain consumer ratings -- how satisfied consumers are with the doctors in their plan, for instance-- and clinical performance measures -- how well a healthcare organization prevents and treats illness. Accreditation reports provide information on how accredited organizations meet national standards, and often include clinical performance measures. Look for these quality measures whenever possible. Consult "Your Guide to Choosing Quality Health Care" on the Internet at **www.ahcpr.gov/consumer**.

## Medicare and Medicaid

Illness strikes both rich and poor families. For low-income families, Medicaid is available to defer the costs of treatment. The Health Care Financing Administration (HCFA) administers Medicare, the nation's largest health insurance program, which covers 39 million Americans. In the following pages, you will learn the basics about Medicare insurance as well as useful

contact information on how to find more in-depth information about Medicaid.[47]

### Who is Eligible for Medicare?

Generally, you are eligible for Medicare if you or your spouse worked for at least 10 years in Medicare-covered employment and you are 65 years old and a citizen or permanent resident of the United States. You might also qualify for coverage if you are under age 65 but have a disability or End-Stage Renal disease (permanent kidney failure requiring dialysis or transplant). Here are some simple guidelines:

You can get Part A at age 65 without having to pay premiums if:

- You are already receiving retirement benefits from Social Security or the Railroad Retirement Board.
- You are eligible to receive Social Security or Railroad benefits but have not yet filed for them.
- You or your spouse had Medicare-covered government employment.

If you are under 65, you can get Part A without having to pay premiums if:

- You have received Social Security or Railroad Retirement Board disability benefit for 24 months.
- You are a kidney dialysis or kidney transplant patient.

Medicare has two parts:

- Part A (Hospital Insurance). Most people do not have to pay for Part A.
- Part B (Medical Insurance). Most people pay monthly for Part B.

### Part A (Hospital Insurance)

**Helps Pay For:** Inpatient hospital care, care in critical access hospitals (small facilities that give limited outpatient and inpatient services to people in rural areas) and skilled nursing facilities, hospice care, and some home healthcare.

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[47] This section has been adapted from the Official U.S. Site for Medicare Information: **http://www.medicare.gov/Basics/Overview.asp**.

**Cost:** Most people get Part A automatically when they turn age 65. You do not have to pay a monthly payment called a premium for Part A because you or a spouse paid Medicare taxes while you were working.

If you (or your spouse) did not pay Medicare taxes while you were working and you are age 65 or older, you still may be able to buy Part A. If you are not sure you have Part A, look on your red, white, and blue Medicare card. It will show "Hospital Part A" on the lower left corner of the card. You can also call the Social Security Administration toll free at 1-800-772-1213 or call your local Social Security office for more information about buying Part A. If you get benefits from the Railroad Retirement Board, call your local RRB office or 1-800-808-0772. For more information, call your Fiscal Intermediary about Part A bills and services. The phone number for the Fiscal Intermediary office in your area can be obtained from the following Web site: **http://www.medicare.gov/Contacts/home.asp**.

### Part B (Medical Insurance)

**Helps Pay For:** Doctors, services, outpatient hospital care, and some other medical services that Part A does not cover, such as the services of physical and occupational therapists, and some home healthcare. Part B helps pay for covered services and supplies when they are medically necessary.

**Cost:** As of 2001, you pay the Medicare Part B premium of $50.00 per month. In some cases this amount may be higher if you did not choose Part B when you first became eligible at age 65. The cost of Part B may go up 10% for each 12-month period that you were eligible for Part B but declined coverage, except in special cases. You will have to pay the extra 10% cost for the rest of your life.

Enrolling in Part B is your choice. You can sign up for Part B anytime during a 7-month period that begins 3 months before you turn 65. Visit your local Social Security office, or call the Social Security Administration at 1-800-772-1213 to sign up. If you choose to enroll in Part B, the premium is usually taken out of your monthly Social Security, Railroad Retirement, or Civil Service Retirement payment. If you do not receive any of the above payments, Medicare sends you a bill for your part B premium every 3 months. You should receive your Medicare premium bill in the mail by the 10th of the month. If you do not, call the Social Security Administration at 1-800-772-1213, or your local Social Security office. If you get benefits from the Railroad Retirement Board, call your local RRB office or 1-800-808-0772. For more information, call your Medicare carrier about bills and services. The

phone number for the Medicare carrier in your area can be found at the following Web site: **http://www.medicare.gov/Contacts/home.asp**. You may have choices in how you get your healthcare including the Original Medicare Plan, Medicare Managed Care Plans (like HMOs), and Medicare Private Fee-for-Service Plans.

### Medicaid

Medicaid is a joint federal and state program that helps pay medical costs for some people with low incomes and limited resources. Medicaid programs vary from state to state. People on Medicaid may also get coverage for nursing home care and outpatient prescription drugs which are not covered by Medicare. You can find more information about Medicaid on the HCFA.gov Web site at **http://www.hcfa.gov/medicaid/medicaid.htm**.

States also have programs that pay some or all of Medicare's premiums and may also pay Medicare deductibles and coinsurance for certain people who have Medicare and a low income. To qualify, you must have:

- Part A (Hospital Insurance),
- Assets, such as bank accounts, stocks, and bonds that are not more than $4,000 for a single person, or $6,000 for a couple, and
- A monthly income that is below certain limits.

For more information on these programs, look at the Medicare Savings Programs brochure, **http://www.medicare.gov/Library/PDFNavigation/PDFInterim.asp?Language=English&Type=Pub&PubID=10126**. There are also Prescription Drug Assistance Programs available. Find information on these programs which offer discounts or free medications to individuals in need at **http://www.medicare.gov/Prescription/Home.asp**.

## NORD's Medication Assistance Programs

Finally, the National Organization for Rare Disorders, Inc. (NORD) administers medication programs sponsored by humanitarian-minded pharmaceutical and biotechnology companies to help uninsured or under-insured individuals secure life-saving or life-sustaining drugs.[48] NORD

[48] Adapted from NORD: **http://www.rarediseases.org/cgi-bin/nord/progserv#patient?id=rPIzL9oD&mv_pc=30**.

programs ensure that certain vital drugs are available "to those individuals whose income is too high to qualify for Medicaid but too low to pay for their prescribed medications." The program has standards for fairness, equity, and unbiased eligibility. It currently covers some 14 programs for nine pharmaceutical companies. NORD also offers early access programs for investigational new drugs (IND) under the approved "Treatment INDs" programs of the Food and Drug Administration (FDA). In these programs, a limited number of individuals can receive investigational drugs that have yet to be approved by the FDA. These programs are generally designed for rare diseases or disorders. For more information, visit **www.rarediseases.org**.

## Additional Resources

In addition to the references already listed in this chapter, you may need more information on health insurance, hospitals, or the healthcare system in general. The NIH has set up an excellent guidance Web site that addresses these and other issues. Topics include:[49]

- Health Insurance:
  **http://www.nlm.nih.gov/medlineplus/healthinsurance.html**
- Health Statistics:
  **http://www.nlm.nih.gov/medlineplus/healthstatistics.html**
- HMO and Managed Care:
  **http://www.nlm.nih.gov/medlineplus/managedcare.html**
- Hospice Care: **http://www.nlm.nih.gov/medlineplus/hospicecare.html**
- Medicaid: **http://www.nlm.nih.gov/medlineplus/medicaid.html**
- Medicare: **http://www.nlm.nih.gov/medlineplus/medicare.html**
- Nursing Homes and Long-term Care:
  **http://www.nlm.nih.gov/medlineplus/nursinghomes.html**
- Patient's Rights, Confidentiality, Informed Consent, Ombudsman Programs, Privacy and Patient Issues:
  **http://www.nlm.nih.gov/medlineplus/patientissues.html**
- Veteran's Health, Persian Gulf War, Gulf War Syndrome, Agent Orange:
  **http://www.nlm.nih.gov/medlineplus/veteranshealth.html**

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[49] You can access this information at:
**http://www.nlm.nih.gov/medlineplus/healthsystem.html**.

## Vocabulary Builder

**Anthelmintic:** An agent that is destructive to worms. [EU]

**Capsules:** Hard or soft soluble containers used for the oral administration of medicine. [NIH]

**Carbohydrate:** An aldehyde or ketone derivative of a polyhydric alcohol, particularly of the pentahydric and hexahydric alcohols. They are so named because the hydrogen and oxygen are usually in the proportion to form water, (CH2O)n. The most important carbohydrates are the starches, sugars, celluloses, and gums. They are classified into mono-, di-, tri-, poly- and heterosaccharides. [EU]

**Cholesterol:** The principal sterol of all higher animals, distributed in body tissues, especially the brain and spinal cord, and in animal fats and oils. [NIH]

**Degenerative:** Undergoing degeneration : tending to degenerate; having the character of or involving degeneration; causing or tending to cause degeneration. [EU]

**Diarrhea:** Passage of excessively liquid or excessively frequent stools. [NIH]

**Electrolyte:** A substance that dissociates into ions when fused or in solution, and thus becomes capable of conducting electricity; an ionic solute. [EU]

**Helminths:** Commonly known as parasitic worms, this group includes the acanthocephala, nematoda, and platyhelminths. Some authors consider certain species of leeches that can become temporarily parasitic as helminths. [NIH]

**Iodine:** A nonmetallic element of the halogen group that is represented by the atomic symbol I, atomic number 53, and atomic weight of 126.90. It is a nutritionally essential element, especially important in thyroid hormone synthesis. In solution, it has anti-infective properties and is used topically. [NIH]

**Neural:** 1. pertaining to a nerve or to the nerves. 2. situated in the region of the spinal axis, as the neutral arch. [EU]

**Niacin:** Water-soluble vitamin of the B complex occurring in various animal and plant tissues. Required by the body for the formation of coenzymes NAD and NADP. Has pellagra-curative, vasodilating, and antilipemic properties. [NIH]

**Potassium:** An element that is in the alkali group of metals. It has an atomic symbol K, atomic number 19, and atomic weight 39.10. It is the chief cation in the intracellular fluid of muscle and other cells. Potassium ion is a strong electrolyte and it plays a significant role in the regulation of fluid volume and maintenance of the water-electrolyte balance. [NIH]

**Proteins:** Polymers of amino acids linked by peptide bonds. The specific

sequence of amino acids determines the shape and function of the protein. [NIH]

**Riboflavin:** Nutritional factor found in milk, eggs, malted barley, liver, kidney, heart, and leafy vegetables. The richest natural source is yeast. It occurs in the free form only in the retina of the eye, in whey, and in urine; its principal forms in tissues and cells are as FMN and FAD. [NIH]

**Selenium:** An element with the atomic symbol Se, atomic number 34, and atomic weight 78.96. It is an essential micronutrient for mammals and other animals but is toxic in large amounts. Selenium protects intracellular structures against oxidative damage. It is an essential component of glutathione peroxidase. [NIH]

**Strongyloidiasis:** Infection with nematodes of the genus strongyloides. The presence of larvae may produce pneumonitis and the presence of adult worms in the intestine could lead to moderate to severe diarrhea. [NIH]

**Thyroxine:** An amino acid of the thyroid gland which exerts a stimulating effect on thyroid metabolism. [NIH]

**Toxicity:** The quality of being poisonous, especially the degree of virulence of a toxic microbe or of a poison. [EU]

# APPENDIX E. MORE ON PARASITIC ROUNDWORM DISEASES

## Overview[50]

A parasite is a living being or organism that exists by depending on another organism. Parasites that infect humans are much more widespread than many people realize. These diseases affect not only poverty-stricken peoples in remote areas of the world, but they also can be important health problems for rich and poor throughout the world, including the United States.

As with other parasitic diseases, roundworm infections are more common in warm climates than in cooler, temperate areas. Many roundworm parasitic diseases result from human carelessness and a lack of appropriate personal hygiene and sanitation measures. Thus, the best solution to the problem rests in preventing these infections rather than in curing them.

Roundworms, or nematodes, are a group of invertebrates (animals having no backbone) with long, round bodies. They range in size from those plainly visible to the naked eye to those several hundredths-of-an-inch long and visible only under a microscope. Most roundworms or their eggs are found in the soil and can be picked up on the hands and transferred to the mouth or can enter through the skin. With the exception of the roundworm that causes trichinosis, mature roundworms eventually end up or live in human intestines and cause a variety of health problems.

Some of the most common parasitic roundworms in humans are:

- Enterobius vermicularis, the pinworm that causes enterobiasis;

[50] Adapted from The National Institute of Allergy and Infectious Diseases (NIAID): **http://www.niaid.nih.gov/factsheets/roundwor.htm**.

- Ascaris lumbricoides, the large intestinal roundworm that causes ascariasis;
- Necator and Ancylostoma, two types of hookworms that cause ancylostomiasis;
- Trichuris trichiura, the whipworm that causes trichuriasis;
- Strongyloides stercoralis that causes strongyloidiasis; and
- Trichinella spiralis that causes trichinosis.

## Pinworm Infection (Enterobiasis)

A pinworm is the most common roundworm parasite in temperate climates – even in areas with high levels of sanitation. In the United States, it is the most common of all parasitic roundworm infections, affecting up to one-third of the country's children. Because pinworm infection is spread mainly by children, it is found most often in family groups, day-care centers, schools, and camps.

Pinworms are small, threadlike roundworms found primarily in the colon and rectum. The life cycle of the pinworm – egg, larva, and mature worm – takes place inside the human body and requires from three to six weeks to complete.

### How Do Pinworms Get into the Body?

Pinworms enter the body when eggs are swallowed. The female pinworm expels thousands of eggs into the environment. Because the eggs are moist and a bit resistant to drying, they may be able to infect someone for several days after being distributed in dust. They can cling to the fingers of children.

Exposure to infective eggs may occur when the person who is infected scratches the contaminated area (the area around the anus where the female worm deposits her eggs) and then transfers the eggs to the fingertips and from there to the mouth. The eggs may be scattered into the air from bed linen and clothing, and can cling to doorknobs, furniture, tubs and faucets, and even food. Although a person may have no symptoms over a long period, episodes of infection may return repeatedly.

Folklore is filled with fantastic descriptions of symptoms and abnormal behavior blamed on pinworm infection. Actually, the symptoms are usually

mild and vague. Movement of egg-laden female worms from the anus will often produce itching of the anus or vagina that, in some cases, may become very intense and even interfere with sleep.

### How Is Pinworm Infection Diagnosed?

A doctor or other health care worker can diagnose pinworm infection by finding the eggs. The most common way to collect the eggs is a rather simple one involving swabbing the anal area with the sticky side of a piece of transparent cellophane tape. The tape is then transferred to a slide where it can be looked at under a microscope.

### How Can Pinworm Infections Be Prevented?

You can prevent becoming infected or reinfected with pinworms by:

- Bathing frequently;
- Using clean underclothing, night clothes, and bed sheets; and
- Washing your hands routinely, particularly after using the bathroom.

### How Are Pinworm Infections Treated?

Some doctors believe that no treatment is necessary for pinworm infections that have no symptoms. This is because children usually outgrow the infection. Because of the strong probability that small children will get infected again outside the home, strenuous efforts to eliminate the eggs from the household are of little help.

If the doctor does prescribe medicine, all members of the household should take it, regardless of whether they have symptoms. Drugs such as mebendazole and pyrantel pamoate (Povan) are the most useful in treating pinworm infections.

To relieve intense itching that often accompanies pinworm infection, a doctor may prescribe a soothing ointment or cream.

## Ascariasis

The name Ascaris lumbricoides reflects the resemblance of this intestinal roundworm to the common earthworm known as Lumbricus. Ranging in length from six to 13 inches, the female worm may grow to be as thick as a pencil. Ascaris infections are common throughout the world in both temperate and tropical areas. In areas of poor sanitation, everyone may be harboring the parasite. Amazingly, up to a hundred worms can infect one person.

### How Is Ascariasis Spread?

Almost more than any other parasitic disease, human carelessness causes ascaris. Human feces in streets, fields, and yards are a major source of infective eggs in heavily populated areas. The eggs of ascarids do not infect humans when first excreted by the worm. The eggs are very resistant to extremes of temperature and humidity. They usually are transmitted by hand to mouth, although the use of human feces as fertilizer may also permit transmission of infective eggs by food that is grown in the soil and eaten without being thoroughly washed. The eggs require several weeks to develop and become infective.
When a person swallows the eggs, they pass into the intestine where they hatch into larvae. The larvae then begin their journey through the body. Once through the intestinal wall, they reach the lungs by means of the blood or lymphatic system. In the lungs, they pass through the air sacs, are carried up the bronchial tree, and are re-swallowed to be returned to the small intestine where they grow, mature, and mate. The worms become mature in about two months.

### Can Pets Transmit These Worms to Humans?

Other species of ascarids such as Toxocara, which infect dogs and cats, can, under certain circumstances, be picked up by humans. In dogs and cats, these ascarids have a migratory cycle similar to A. lumbricoides. In humans, however, they fail to reach the intestine. Instead they remain active in other body tissue for some time. This state of larval migration is known as visceral larva migrans.

Young puppies and kittens contribute most to contamination of soil by eggs that must incubate for some time in the soil. Almost all dogs are infected at birth. Older dogs, however, have usually become immune to the parasite.

### What Are the Symptoms of Ascariasis?

A few worms in the intestine may cause no symptoms or may give rise only to vague or intermittent abdominal pain. Heavy infection may cause partial or complete blockage of the intestine resulting in severe abdominal pain, vomiting, restlessness, and disturbed sleep. The heavier or greater the worm infection, the more severe the symptoms are likely to be. Occasionally, the first sign of infection may be the presence of a worm in vomit or in the stool.

### How Is Ascariasis Diagnosed?

A large number of larvae invading the lungs at one time may cause pneumonia. This stage of the disease precedes the intestinal phase by weeks, and the symptoms are difficult to diagnose. Once mature female worms are present in the intestine, however, a doctor can diagnose the infection by finding characteristic eggs in the stool.

### How Is Ascariasis Treated?

Doctors can treat ascariasis successfully with mebendazole, albendazole, or pyrantel pamoate.

## Hookworm Disease (Ancylostomiasis)

One of the most common roundworm infections is hookworm. Like ascarids, people pick up hookworms as a result of unsanitary conditions. Hookworm eggs are passed in human feces onto the ground where they develop into infective larvae. When the soil is cool, the worms crawl to the nearest moist area and extend their bodies into the air. They remain there – waving their bodies to and fro – until they come into contact with the skin, usually on a bare foot, or until they are driven back down by the heat.

Hookworm is widespread in those tropical and subtropical countries in which people defecate on the ground and soil moisture is most favorable. Necator americanus is the prevailing species in the southeastern United States.

### How Is Hookworm Disease Spread?

People usually get this infection by walking barefoot over contaminated soil. In penetrating the skin, the larvae may cause an allergic reaction. It is from the itchy patch at the place where the larvae entered that the early infection gets its nickname "ground itch." Once larvae have broken through the skin, they enter the bloodstream and are carried to the lungs. (Unlike ascarids, however, hookworms do not usually cause pneumonia.) The larvae migrate from the lungs up the windpipe to be swallowed and carried back down to the intestine.

### What Are the Symptoms of Hookworm Disease?

Diarrhea, particularly in person who has never been infected, sometimes starts as the worms mature in the intestines and before eggs appear in the stool. Other signs and symptoms at this stage include vague abdominal pain, intestinal cramps, colic, and nausea.

Scientists have learned that people in good health and on a diet containing adequate iron can tolerate the presence of these worms in small or moderate numbers without having problems. In chronic infections, if the number of parasites becomes great enough, a person can develop serious anemia because of blood loss from the worms attaching themselves to the intestine and sucking the blood and tissue juices.

If humans come into contact with larvae of the dog hookworm or the cat hookworm, or larvae of certain other hookworms that do not infect humans, the larvae may penetrate the skin. But these larvae cannot complete their migratory cycle in humans. Instead, they move just below the skin producing snake-like markings and intense itching. This is referred to as a creeping eruption or cutaneous larva migrans.

Ancylostoma canium, an illness caused by a particular species of dog hookworm, has been described in Australia. This worm may almost complete its development in the lower small intestine, but produces a severe inflammatory reaction in the bowel, causing abdominal pain, diarrhea, and an increase in certain white blood cells called eosinophils.

### How Is Hookworm Disease Diagnosed?

A laboratory worker will examine stool specimens to look for and count the number of eggs. If the egg output is large enough – more than 2,000 eggs per gram of stool – the doctor will assume that the infection may cause anemia and start treating the patient.

### How Is Hookworm Disease Treated?

Once a person has been diagnosed with hookworm disease, a doctor can prescribe medicines such as mebendazole or albendazole. Frequently, the doctor will add an iron supplement to this treatment.

## Whipworm Disease (Trichuriasis)

This parasitic roundworm infection of the large intestine often has no symptoms, but a doctor usually can diagnose it by examining the stool and finding whipworm eggs. Heavy infections may cause intermittent stomach pain, bloody stools, diarrhea, and weight loss. The name whipworm comes from the parasite's long, very thin, whiplike shape. Fertilized eggs develop outside the body, and an embryonated egg is produced in three weeks in a favorable environment; that is, warm, moist, shaded soil.

Although the incidence of whipworm infection is high, its intensity is usually light. In the United States, the infection occurs principally in warm, moist climates, most frequently among children. People can get infected by accidentally eating whipworm eggs on their hands or in food or drink. Severe infections in young children can result in serious disease with bloody diarrhea and a condition called rectal prolapse.

Doctors treat whipworm disease most often with mebendazole and albendazole.

## Strongyloidiasis

The parasitic roundworm called Strongyloides stercoralis mainly infects humans. This parasite has different types of life cycles. One is direct, similar to that of the hookworm. After a short feeding period and development in the soil, the larvae penetrate human skin, enter the blood stream, and pass

through the right side of the heart to the lungs. From the lungs, the adolescent parasites go up the windpipe into the mouth, are swallowed, and reach the upper part of the small intestine where they develop into mature worms.

Under certain conditions, parasites may undergo an indirect life cycle in which free-living mature male and female worms develop in the soil and produce a new generation of large numbers of larvae.

At times, the larvae may develop rapidly into the infective state in the intestine where they penetrate the intestinal lining instead of passing out of the body in the feces, as occurs normally. This modification of the life cycle, called internal autoinfection, explains persistent strongyloidiasis, as long as 40 years in patients who have moved to areas where the disease is not generally found. Autoinfection may produce heavy infections and severe disease, especially in patients with reduced immunity such as those receiving corticosteroids or other immunosuppressive drug treatment.

### What Are the Symptoms of Strongyloidiasis?

Many Strongyloides infections are mild and go unnoticed. Moderate infections may cause a burning pain in the abdomen. Nausea and vomiting may be present, and diarrhea and constipation alternate. Severe infections result in anemia, weight loss, and chronic diarrhea.

### How Is Strongyloidiasis Diagnosed?

Laboratory diagnosis includes the examination of feces and duodenal contents for larvae. Scientists at the National Institute of Allergy and Infectious Diseases have developed a reliable blood test to detect antibodies to Strongyloides.

### How Is Strongyloidiasis Treated?

Thiabendazole (Mintezol) given twice daily for two or three days is the one of the treatments doctors recommend. Ivermectin given in one or two days, or albendazole given in two courses 10 days apart also are effective.

## Trichinosis

Trichinosis is an infection by the larvae of a most versatile roundworm, Trichinella spiralis. This parasite can infect virtually every meat-eating mammal. Unlike the other parasitic roundworm diseases that have been discussed, trichinosis is not an intestinal infection in the usual sense. It is the migration of T. spiralis larvae through the body and their encystment (becoming enclosed in a capsule) in a muscle that creates serious problems. The parasite is especially common in rats and in swine that feed on uncooked garbage. The disease occurs in humans when they eat undercooked infected pork.

Although trichinosis is sometimes found in cities, it is much more common in rural areas, particularly in the hog-raising areas of the United States. Because many states have adopted laws requiring that all garbage fed to hogs be sterilized, fewer people get trichinosis.

Typically, the life cycle of the parasite begins when a person or an animal eats contaminated meat containing larvae. Digestive juices from the stomach dissolve the capsule-like cyst and release the parasites. The larvae then penetrate into the intestine where they mature and mate. Female worms then pass larvae into the blood stream where they make their way through the capillaries (tiny blood vessels) into the muscle fibers. Once in the muscle fibers, they encyst again and begin a sometimes long life.

### What Are the Symptoms of Trichinosis?

The average case of trichinosis is not severe and produces no noticeable discomfort. It can produce symptoms that are frequently overlooked or ignored – a slight stomachache and achy muscles and joints. Invasion by a large number of parasites, however, produces symptoms that mimic food poisoning followed by severe "muscular rheumatism."

### How Is Trichinosis Diagnosed?

Although a doctor may suspect that a patient has trichinosis on the basis of clinical signs, it is usually diagnosed as the result of: 1) a blood test that shows an increase in the number of eosinophils, a type of white blood cell; or 2) microscopic examination of muscle tissue to look for the larvae.

### How Is Trichinosis Treated?

A doctor can prescribe medicine only to relieve symptoms. There is no treatment for the infection. If the doctor diagnoses infection while the patient is still having digestive symptoms, standard antiparasite drugs can be used to dislodge some of the worms. Once encystment of the parasite has begun, treatment is for any symptoms. In most cases, the chances of recovery are good.

Thiabendazole may help patients with trichinosis if treatment is begun very early, during the incubation state. Corticosteroids can relieve the inflammatory reaction during the larval migration state, and the patient should take them with thiabenazole. Steroids could, however, prolong the intestinal phase of the infection.

### How Is Trichinosis Prevented?

Researchers and health care providers have known all the basic facts necessary for preventing trichinosis in humans for years. You can kill the parasite by cooking (allowing all parts of the meat to reach at least 150 degrees Fahrenheit), freezing (16 degrees Fahrenheit for 36 hours). Irradiation can also kill T. spiralis. Smoking, pickling, and other methods of processing or preserving meats do not kill the parasite.

## Research

Researchers at the National Institute of Allergy and Infectious (NIAID) diseases are conducting basic and clinical research on the prevention, control, and treatment of a variety of parasitic diseases, including some caused by parasitic roundworms. NIAID scientists are trying to determine the factors that allow Strongyloides stercoralis roundworms to infect humans and cause disease. The findings from this research may help scientists develop a skin test to diagnose stronglyloidiasis.

## Vocabulary Builder

**Abdomen:** That portion of the body that lies between the thorax and the pelvis. [NIH]

**Ancylostoma:** A genus of nematode intestinal parasites that consists of

several species. A. duodenale is the common hookworm in humans. A. braziliense, A. ceylonicum, and A. caninum occur primarily in cats and dogs, but all have been known to occur in humans. [NIH]

**Ancylostomiasis:** Infection of humans or animals with hookworms of the genus ancylostoma. Characteristics include anemia, dyspepsia, eosinophilia, and abdominal swelling. [NIH]

**Anemia:** A reduction in the number of circulating erythrocytes or in the quantity of hemoglobin. [NIH]

**Ascaris:** A genus of nematodes of the superfamily ascaridoidea whose species usually inhabit the intestine. [NIH]

**Bronchial:** Pertaining to one or more bronchi. [EU]

**Colic:** Paroxysms of pain. This condition usually occurs in the abdominal region but may occur in other body regions as well. [NIH]

**Constipation:** Infrequent or difficult evacuation of the faeces. [EU]

**Cutaneous:** Pertaining to the skin; dermal; dermic. [EU]

**Eosinophils:** Granular leukocytes with a nucleus that usually has two lobes connected by a slender thread of chromatin, and cytoplasm containing coarse, round granules that are uniform in size and stainable by eosin. [NIH]

**Feces:** The excrement discharged from the intestines, consisting of bacteria, cells exfoliated from the intestines, secretions, chiefly of the liver, and a small amount of food residue. [EU]

**Incubation:** The development of an infectious disease from the entrance of the pathogen to the appearance of clinical symptoms. [EU]

**Intermittent:** Occurring at separated intervals; having periods of cessation of activity. [EU]

**Invertebrates:** Animals that have no spinal column. [NIH]

**Nausea:** An unpleasant sensation, vaguely referred to the epigastrium and abdomen, and often culminating in vomiting. [EU]

**Necator:** A genus of intestinal parasite worms which includes one of the most important hookworms of man, necator americanus. The only other known species, N. suillus, has been recovered from pigs. [NIH]

**Poisoning:** A condition or physical state produced by the ingestion, injection or inhalation of, or exposure to a deleterious agent. [NIH]

**Prolapse:** 1. the falling down, or sinking, of a part or viscus; procidentia. 2. to undergo such displacement. [EU]

**Sanitation:** The development and establishment of environmental conditions favorable to the health of the public. [NIH]

**Species:** A taxonomic category subordinate to a genus (or subgenus) and

superior to a subspecies or variety, composed of individuals possessing common characters distinguishing them from other categories of individuals of the same taxonomic level. In taxonomic nomenclature, species are designated by the genus name followed by a Latin or Latinized adjective or noun. [EU]

**Stomach:** An organ of digestion situated in the left upper quadrant of the abdomen between the termination of the esophagus and the beginning of the duodenum. [NIH]

**Strongyloides:** A genus of parasitic nematodes widely distributed as intestinal parasites of mammals. [NIH]

**Toxocara:** A genus of ascarid nematodes commonly parasitic in the intestines of cats and dogs. [NIH]

**Trichinella:** A genus of parasitic nematodes that causes trichinosis in man and carnivores. [NIH]

**Trichuriasis:** Infection with nematodes of the genus trichuris, formerly called Trichocephalus. [NIH]

**Trichuris:** A genus of nematode worms comprising the whipworms. [NIH]

# ONLINE GLOSSARIES

The Internet provides access to a number of free-to-use medical dictionaries and glossaries. The National Library of Medicine has compiled the following list of online dictionaries:

- ADAM Medical Encyclopedia (A.D.A.M., Inc.), comprehensive medical reference: **http://www.nlm.nih.gov/medlineplus/encyclopedia.html**
- MedicineNet.com Medical Dictionary (MedicineNet, Inc.): **http://www.medterms.com/Script/Main/hp.asp**
- Merriam-Webster Medical Dictionary (Inteli-Health, Inc.): **http://www.intelihealth.com/IH/**
- Multilingual Glossary of Technical and Popular Medical Terms in Eight European Languages (European Commission) - Danish, Dutch, English, French, German, Italian, Portuguese, and Spanish: **http://allserv.rug.ac.be/~rvdstich/eugloss/welcome.html**
- On-line Medical Dictionary (CancerWEB): **http://www.graylab.ac.uk/omd/**
- Technology Glossary (National Library of Medicine) - Health Care Technology: **http://www.nlm.nih.gov/nichsr/ta101/ta10108.htm**
- Terms and Definitions (Office of Rare Diseases): **http://rarediseases.info.nih.gov/ord/glossary_a-e.html**

Beyond these, MEDLINEplus contains a very user-friendly encyclopedia covering every aspect of medicine (licensed from A.D.A.M., Inc.). The ADAM Medical Encyclopedia Web site address is **http://www.nlm.nih.gov/medlineplus/encyclopedia.html**. ADAM is also available on commercial Web sites such as Web MD (**http://my.webmd.com/adam/asset/adam_disease_articles/a_to_z/a)** and drkoop.com (**http://www.drkoop.com/**). Topics of interest can be researched by using keywords before continuing elsewhere, as these basic definitions and concepts will be useful in more advanced areas of research. You may choose to print various pages specifically relating to pinworm infection and keep them on file.

## Online Dictionary Directories

The following are additional online directories compiled by the National Library of Medicine, including a number of specialized medical dictionaries and glossaries:

- Medical Dictionaries: Medical & Biological (World Health Organization): **http://www.who.int/hlt/virtuallibrary/English/diction.htm#Medical**
- MEL-Michigan Electronic Library List of Online Health and Medical Dictionaries (Michigan Electronic Library): **http://mel.lib.mi.us/health/health-dictionaries.html**
- Patient Education: Glossaries (DMOZ Open Directory Project): **http://dmoz.org/Health/Education/Patient_Education/Glossaries/**
- Web of Online Dictionaries (Bucknell University): **http://www.yourdictionary.com/diction5.html#medicine**

# PINWORM INFECTION GLOSSARY

The following is a complete glossary of terms used in this sourcebook. The definitions are derived from official public sources including the National Institutes of Health [NIH] and the European Union [EU]. After this glossary, we list a number of additional hardbound and electronic glossaries and dictionaries that you may wish to consult.

**Abdomen:** That portion of the body that lies between the thorax and the pelvis. [NIH]

**Adjuvant:** A substance which aids another, such as an auxiliary remedy; in immunology, nonspecific stimulator (e.g., BCG vaccine) of the immune response. [EU]

**Anal:** Pertaining to the anus. [EU]

**Ancylostoma:** A genus of nematode intestinal parasites that consists of several species. A. duodenale is the common hookworm in humans. A. braziliense, A. ceylonicum, and A. caninum occur primarily in cats and dogs, but all have been known to occur in humans. [NIH]

**Ancylostomiasis:** Infection of humans or animals with hookworms of the genus ancylostoma. Characteristics include anemia, dyspepsia, eosinophilia, and abdominal swelling. [NIH]

**Anemia:** A reduction in the number of circulating erythrocytes or in the quantity of hemoglobin. [NIH]

**Anorexia:** Lack or loss of the appetite for food. [EU]

**Anthelmintic:** An agent that is destructive to worms. [EU]

**Antibody:** An immunoglobulin molecule that has a specific amino acid sequence by virtue of which it interacts only with the antigen that induced its synthesis in cells of the lymphoid series (especially plasma cells), or with antigen closely related to it. Antibodies are classified according to their ode of action as agglutinins, bacteriolysins, haemolysins, opsonins, precipitins, etc. [EU]

**Antigen:** Any substance which is capable, under appropriate conditions, of inducing a specific immune response and of reacting with the products of that response, that is, with specific antibody or specifically sensitized T-lymphocytes, or both. Antigens may be soluble substances, such as toxins and foreign proteins, or particulate, such as bacteria and tissue cells; however, only the portion of the protein or polysaccharide molecule known as the antigenic determinant (q.v.) combines with antibody or a specific receptor on a lymphocyte. Abbreviated Ag. [EU]

**Antimicrobial:** Killing microorganisms, or suppressing their multiplication or growth. [EU]

**Anus:** The distal or terminal orifice of the alimentary canal. [EU]

**Ascariasis:** Infection by nematodes of the genus ascaris. Ingestion of infective eggs causes diarrhea and pneumonitis. Its distribution is more prevalent in areas of poor sanitation and where human feces are used for fertilizer. [NIH]

**Ascaris:** A genus of nematodes of the superfamily ascaridoidea whose species usually inhabit the intestine. [NIH]

**Asymptomatic:** Showing or causing no symptoms. [EU]

**Autoimmunity:** Process whereby the immune system reacts against the body's own tissues. Autoimmunity may produce or be caused by autoimmune diseases. [NIH]

**Bioterrorism:** The use of biological agents in terrorism. This includes the malevolent use of bacteria, viruses, or toxins against people, animals, or plants. [NIH]

**Bronchial:** Pertaining to one or more bronchi. [EU]

**Capsules:** Hard or soft soluble containers used for the oral administration of medicine. [NIH]

**Carbohydrate:** An aldehyde or ketone derivative of a polyhydric alcohol, particularly of the pentahydric and hexahydric alcohols. They are so named because the hydrogen and oxygen are usually in the proportion to form water, (CH2O)n. The most important carbohydrates are the starches, sugars, celluloses, and gums. They are classified into mono-, di-, tri-, poly- and heterosaccharides. [EU]

**Cellulose:** A polysaccharide with glucose units linked as in cellobiose. It is the chief constituent of plant fibers, cotton being the purest natural form of the substance. As a raw material, it forms the basis for many derivatives used in chromatography, ion exchange materials, explosives manufacturing, and pharmaceutical preparations. [NIH]

**Cholesterol:** The principal sterol of all higher animals, distributed in body tissues, especially the brain and spinal cord, and in animal fats and oils. [NIH]

**Chronic:** Persisting over a long period of time. [EU]

**Colic:** Paroxysms of pain. This condition usually occurs in the abdominal region but may occur in other body regions as well. [NIH]

**Constipation:** Infrequent or difficult evacuation of the faeces. [EU]

**Contamination:** The soiling or pollution by inferior material, as by the introduction of organisms into a wound, or sewage into a stream. [EU]

**Cutaneous:** Pertaining to the skin; dermal; dermic. [EU]

**Defecation:** The normal process of elimination of fecal material from the rectum. [NIH]

**Degenerative:** Undergoing degeneration : tending to degenerate; having the character of or involving degeneration; causing or tending to cause degeneration. [EU]

**Diarrhea:** Passage of excessively liquid or excessively frequent stools. [NIH]

**Disinfection:** Rendering pathogens harmless through the use of heat, antiseptics, antibacterial agents, etc. [NIH]

**Electrolyte:** A substance that dissociates into ions when fused or in solution, and thus becomes capable of conducting electricity; an ionic solute. [EU]

**Endemic:** Present or usually prevalent in a population or geographical area at all times; said of a disease or agent. Called also endemial. [EU]

**Enterobiasis:** Infection with nematodes of the genus enterobius. E. vermicularis, the pinworm of man, causes a crawling sensation and pruritus. This condition results in scratching the area, occasionally causing scarification. [NIH]

**Enterobius:** A genus of intestinal nematode worms which includes the pinworm or threadworm Enterobius vermicularis. [NIH]

**Eosinophils:** Granular leukocytes with a nucleus that usually has two lobes connected by a slender thread of chromatin, and cytoplasm containing coarse, round granules that are uniform in size and stainable by eosin. [NIH]

**Epitopes:** Sites on an antigen that interact with specific antibodies. [NIH]

**Feces:** The excrement discharged from the intestines, consisting of bacteria, cells exfoliated from the intestines, secretions, chiefly of the liver, and a small amount of food residue. [EU]

**Fenbendazole:** Antinematodal benzimidazole used in veterinary medicine. [NIH]

**Gastrointestinal:** Pertaining to or communicating with the stomach and intestine, as a gastrointestinal fistula. [EU]

**Genital:** Pertaining to the genitalia. [EU]

**Granuloma:** A relatively small nodular inflammatory lesion containing grouped mononuclear phagocytes, caused by infectious and noninfectious agents. [NIH]

**Helminths:** Commonly known as parasitic worms, this group includes the acanthocephala, nematoda, and platyhelminths. Some authors consider certain species of leeches that can become temporarily parasitic as helminths. [NIH]

**Incubation:** The development of an infectious disease from the entrance of the pathogen to the appearance of clinical symptoms. [EU]

**Inflammation:** A pathological process characterized by injury or destruction of tissues caused by a variety of cytologic and chemical reactions. It is usually manifested by typical signs of pain, heat, redness, swelling, and loss of function. [NIH]

**Ingestion:** The act of taking food, medicines, etc., into the body, by mouth. [EU]

**Intermittent:** Occurring at separated intervals; having periods of cessation of activity. [EU]

**Intestinal:** Pertaining to the intestine. [EU]

**Intestines:** The section of the alimentary canal from the stomach to the anus. It includes the large intestine and small intestine. [NIH]

**Invertebrates:** Animals that have no spinal column. [NIH]

**Iodine:** A nonmetallic element of the halogen group that is represented by the atomic symbol I, atomic number 53, and atomic weight of 126.90. It is a nutritionally essential element, especially important in thyroid hormone synthesis. In solution, it has anti-infective properties and is used topically. [NIH]

**Lumen:** The cavity or channel within a tube or tubular organ. [EU]

**Lupus:** A form of cutaneous tuberculosis. It is seen predominantly in women and typically involves the nasal, buccal, and conjunctival mucosa. [NIH]

**Mebendazole:** A nematocide in humans and animals. It acts by interfering with the carbohydrate metabolism and associated energy production of the parasite. [NIH]

**Microbiology:** The study of microorganisms such as fungi, bacteria, algae, archaea, and viruses. [NIH]

**Molecular:** Of, pertaining to, or composed of molecules : a very small mass of matter. [EU]

**Nausea:** An unpleasant sensation, vaguely referred to the epigastrium and abdomen, and often culminating in vomiting. [EU]

**Necator:** A genus of intestinal parasite worms which includes one of the most important hookworms of man, necator americanus. The only other known species, N. suillus, has been recovered from pigs. [NIH]

**Neonatal:** Pertaining to the first four weeks after birth. [EU]

**Neural:** 1. pertaining to a nerve or to the nerves. 2. situated in the region of the spinal axis, as the neutral arch. [EU]

**Niacin:** Water-soluble vitamin of the B complex occurring in various animal and plant tissues. Required by the body for the formation of coenzymes NAD and NADP. Has pellagra-curative, vasodilating, and antilipemic properties. [NIH]

**Oophoritis:** Inflammation of an ovary. [NIH]

**Parasitic:** Pertaining to, of the nature of, or caused by a parasite. [EU]

**Pelvic:** Pertaining to the pelvis. [EU]

**Perianal:** Located around the anus. [EU]

**Perioperative:** Pertaining to the period extending from the time of hospitalization for surgery to the time of discharge. [EU]

**Pneumonia:** Inflammation of the lungs with consolidation. [EU]

**Poisoning:** A condition or physical state produced by the ingestion, injection or inhalation of, or exposure to a deleterious agent. [NIH]

**Potassium:** An element that is in the alkali group of metals. It has an atomic symbol K, atomic number 19, and atomic weight 39.10. It is the chief cation in the intracellular fluid of muscle and other cells. Potassium ion is a strong electrolyte and it plays a significant role in the regulation of fluid volume and maintenance of the water-electrolyte balance. [NIH]

**Prevalence:** The total number of cases of a given disease in a specified population at a designated time. It is differentiated from incidence, which refers to the number of new cases in the population at a given time. [NIH]

**Prolapse:** 1. the falling down, or sinking, of a part or viscus; procidentia. 2. to undergo such displacement. [EU]

**Prophylaxis:** The prevention of disease; preventive treatment. [EU]

**Proteins:** Polymers of amino acids linked by peptide bonds. The specific sequence of amino acids determines the shape and function of the protein. [NIH]

**Pruritus:** 1. itching; an unpleasant cutaneous sensation that provokes the desire to rub or scratch the skin to obtain relief. 2. any of various conditions marked by itching, the specific site or type being indicated by a modifying term. [EU]

**Rectal:** Pertaining to the rectum (= distal portion of the large intestine). [EU]

**Reinfection:** A second infection by the same pathogenic agent, or a second infection of an organ such as the kidney by a different pathogenic agent. [EU]

**Riboflavin:** Nutritional factor found in milk, eggs, malted barley, liver, kidney, heart, and leafy vegetables. The richest natural source is yeast. It occurs in the free form only in the retina of the eye, in whey, and in urine; its principal forms in tissues and cells are as FMN and FAD. [NIH]

**Sanitation:** The development and establishment of environmental conditions favorable to the health of the public. [NIH]

**Selenium:** An element with the atomic symbol Se, atomic number 34, and atomic weight 78.96. It is an essential micronutrient for mammals and other animals but is toxic in large amounts. Selenium protects intracellular

structures against oxidative damage. It is an essential component of glutathione peroxidase. [NIH]

**Species:** A taxonomic category subordinate to a genus (or subgenus) and superior to a subspecies or variety, composed of individuals possessing common characters distinguishing them from other categories of individuals of the same taxonomic level. In taxonomic nomenclature, species are designated by the genus name followed by a Latin or Latinized adjective or noun. [EU]

**Stomach:** An organ of digestion situated in the left upper quadrant of the abdomen between the termination of the esophagus and the beginning of the duodenum. [NIH]

**Strongyloides:** A genus of parasitic nematodes widely distributed as intestinal parasites of mammals. [NIH]

**Strongyloidiasis:** Infection with nematodes of the genus strongyloides. The presence of larvae may produce pneumonitis and the presence of adult worms in the intestine could lead to moderate to severe diarrhea. [NIH]

**Superinfection:** A new infection complicating the course of antimicrobial therapy of an existing infectious process, and resulting from invasion by bacteria or fungi resistant to the drug(s) in use. It may occur at the site of the original infection or at a remote site. [EU]

**Systemic:** Pertaining to or affecting the body as a whole. [EU]

**Thermoregulation:** Heat regulation. [EU]

**Thyroxine:** An amino acid of the thyroid gland which exerts a stimulating effect on thyroid metabolism. [NIH]

**Tolerance:** 1. the ability to endure unusually large doses of a drug or toxin. 2. acquired drug tolerance; a decreasing response to repeated constant doses of a drug or the need for increasing doses to maintain a constant response. [EU]

**Toxicity:** The quality of being poisonous, especially the degree of virulence of a toxic microbe or of a poison. [EU]

**Toxocara:** A genus of ascarid nematodes commonly parasitic in the intestines of cats and dogs. [NIH]

**Transplantation:** The grafting of tissues taken from the patient's own body or from another. [EU]

**Trichinella:** A genus of parasitic nematodes that causes trichinosis in man and carnivores. [NIH]

**Trichinosis:** A disease due to infection with trichinella spiralis. It is caused by eating undercooked meat, usually pork. [NIH]

**Trichuriasis:** Infection with nematodes of the genus trichuris, formerly

called Trichocephalus. [NIH]

**Trichuris:** A genus of nematode worms comprising the whipworms. [NIH]

**Urinary:** Pertaining to the urine; containing or secreting urine. [EU]

**Vaginal:** 1. of the nature of a sheath; ensheathing. 2. pertaining to the vagina. 3. pertaining to the tunica vaginalis testis. [EU]

**Venereal:** Pertaining or related to or transmitted by sexual contact. [EU]

**Viral:** Pertaining to, caused by, or of the nature of virus. [EU]

**Vulvovaginitis:** Inflammation of the vulva and vagina, or of the vulvovaginal glands. [EU]

**Warts:** Benign epidermal proliferations or tumors; some are viral in origin. [NIH]

## General Dictionaries and Glossaries

While the above glossary is essentially complete, the dictionaries listed here cover virtually all aspects of medicine, from basic words and phrases to more advanced terms (sorted alphabetically by title; hyperlinks provide rankings, information and reviews at Amazon.com):

- **Dictionary of Medical Acronymns & Abbreviations** by Stanley Jablonski (Editor), Paperback, 4th edition (2001), Lippincott Williams & Wilkins Publishers, ISBN: 1560534605, **http://www.amazon.com/exec/obidos/ASIN/1560534605/icongroupinterna**
- **Dictionary of Medical Terms : For the Nonmedical Person (Dictionary of Medical Terms for the Nonmedical Person, Ed 4)** by Mikel A. Rothenberg, M.D, et al, Paperback - 544 pages, 4th edition (2000), Barrons Educational Series, ISBN: 0764112015, **http://www.amazon.com/exec/obidos/ASIN/0764112015/icongroupinterna**
- **A Dictionary of the History of Medicine** by A. Sebastian, CD-Rom edition (2001), CRC Press-Parthenon Publishers, ISBN: 185070368X, **http://www.amazon.com/exec/obidos/ASIN/185070368X/icongroupinterna**
- **Dorland's Illustrated Medical Dictionary (Standard Version)** by Dorland, et al, Hardcover - 2088 pages, 29th edition (2000), W B Saunders Co, ISBN: 0721662544, **http://www.amazon.com/exec/obidos/ASIN/0721662544/icongroupinterna**
- **Dorland's Electronic Medical Dictionary** by Dorland, et al, Software, 29th Book & CD-Rom edition (2000), Harcourt Health Sciences, ISBN: 0721694934, **http://www.amazon.com/exec/obidos/ASIN/0721694934/icongroupinterna**

- **Dorland's Pocket Medical Dictionary (Dorland's Pocket Medical Dictionary, 26th Ed)** Hardcover - 912 pages, 26th edition (2001), W B Saunders Co, ISBN: 0721682812, **http://www.amazon.com/exec/obidos/ASIN/0721682812/icongroupinterna/103-4193558-7304618**
- **Melloni's Illustrated Medical Dictionary (Melloni's Illustrated Medical Dictionary, 4th Ed)** by Melloni, Hardcover, 4th edition (2001), CRC Press-Parthenon Publishers, ISBN: 85070094X, **http://www.amazon.com/exec/obidos/ASIN/85070094X/icongroupinterna**
- **Stedman's Electronic Medical Dictionary Version 5.0 (CD-ROM for Windows and Macintosh, Individual)** by Stedmans, CD-ROM edition (2000), Lippincott Williams & Wilkins Publishers, ISBN: 0781726328, **http://www.amazon.com/exec/obidos/ASIN/0781726328/icongroupinterna**
- **Stedman's Medical Dictionary** by Thomas Lathrop Stedman, Hardcover - 2098 pages, 27th edition (2000), Lippincott, Williams & Wilkins, ISBN: 068340007X, **http://www.amazon.com/exec/obidos/ASIN/068340007X/icongroupinterna**
- **Tabers Cyclopedic Medical Dictionary (Thumb Index)** by Donald Venes (Editor), et al, Hardcover - 2439 pages, 19th edition (2001), F A Davis Co, ISBN: 0803606540, **http://www.amazon.com/exec/obidos/ASIN/0803606540/icongroupinterna**

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