

THE OFFICIAL  
PATIENT'S SOURCEBOOK  
*on*

OROPHARYNGEAL  
CANDIDIASIS



JAMES N. PARKER, M.D.  
AND PHILIP M. PARKER, PH.D., EDITORS

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## Dedication

To the healthcare professionals dedicating their time and efforts to the study of oropharyngeal candidiasis.

## 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 oropharyngeal candidiasis. 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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- The Official Patient's Sourcebook on Other Mycobacterium Species
- The Official Patient's Sourcebook on Pertussis
- The Official Patient's Sourcebook on Pneumonia among Children in Developing Countries
- The Official Patient's Sourcebook on Psittacosis
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- The Official Patient's Sourcebook on Salmonellosis
- The Official Patient's Sourcebook on Shigellosis
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## INTRODUCTION

### Overview

Dr. C. Everett Koop, former U.S. Surgeon General, once said, “The best prescription is knowledge.”<sup>1</sup> 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.<sup>2</sup>

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.<sup>3</sup>

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<sup>1</sup> Quotation from <http://www.drkoop.com>.

<sup>2</sup> The Agency for Healthcare Research and Quality (AHRQ):  
<http://www.ahrq.gov/consumer/diaginfo.htm>.

<sup>3</sup> 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 Oropharyngeal Candidiasis* 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 oropharyngeal candidiasis, 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 oropharyngeal candidiasis.

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 oropharyngeal candidiasis 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 oropharyngeal candidiasis (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 oropharyngeal candidiasis. It also gives you sources of information that can help you find a doctor in your local area specializing in treating oropharyngeal candidiasis. Collectively, the material presented in Part I is a complete primer on basic research topics for patients with oropharyngeal candidiasis.

Part II moves on to advanced research dedicated to oropharyngeal candidiasis. 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 oropharyngeal candidiasis. 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 oropharyngeal candidiasis or related disorders. The appendices are dedicated to more pragmatic issues faced by many patients with oropharyngeal candidiasis. 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 oropharyngeal candidiasis.

## **Scope**

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

- Candidiasis - Oral
- Candidosis
- Monilia
- Moniliasis
- Moniliasis - Oral
- Thrush

In addition to synonyms and related conditions, physicians may refer to oropharyngeal candidiasis 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 oropharyngeal candidiasis:<sup>4</sup>

- 112.0 candidiasis of mouth
- 112.0 thrush
- 112.1 candidiasis of vulva and vagina
- 112.9 candidiasis of unspecified site

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 oropharyngeal candidiasis. 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

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<sup>4</sup> 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."

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.

Why “Internet age”? All too often, patients diagnosed with oropharyngeal candidiasis 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 oropharyngeal candidiasis 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.

While we focus on the more scientific aspects of oropharyngeal candidiasis, 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 oropharyngeal candidiasis. 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 oropharyngeal candidiasis to you or even given you a pamphlet or brochure describing oropharyngeal candidiasis. 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 OROPHARYNGEAL CANDIDIASIS: GUIDELINES

### Overview

Official agencies, as well as federally-funded institutions supported by national grants, frequently publish a variety of guidelines on oropharyngeal candidiasis. 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 oropharyngeal candidiasis 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)<sup>5</sup>

The National Institutes of Health (NIH) is the first place to search for relatively current patient guidelines and fact sheets on oropharyngeal candidiasis. 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.

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<sup>5</sup> 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 oropharyngeal candidiasis 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.<sup>6</sup> 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 oropharyngeal candidiasis.

## What Is Oropharyngeal Candidiasis?<sup>7</sup>

Candidiasis of the mouth and throat, also known as a “thrush” or oropharyngeal candidiasis (OPC), is a fungal infection that occurs when

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<sup>6</sup> 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.

<sup>7</sup> Adapted from The Centers for Disease Control and Prevention (CDC): [http://www.cdc.gov/ncidod/dbmd/diseaseinfo/candidiasis\\_opc\\_g.htm](http://www.cdc.gov/ncidod/dbmd/diseaseinfo/candidiasis_opc_g.htm).

there is overgrowth of fungus called Candida. Candida is normally found on skin or mucous membranes. However, if the environment inside the mouth or throat becomes imbalanced, Candida can multiply. When this happens, symptoms of thrush appear.

### **How Common Is OPC and Who Can Get It?**

OPC can affect normal newborns, but it occurs more frequently and more severely in people with weakened immune systems, particularly in persons with AIDS.

### **What Are the Symptoms of OPC?**

People with OPC infection usually have painless, white patches in the mouth. Symptoms of OPC in the esophagus may include pain and difficulty swallowing.

### **How Did I Get OPC?**

Most cases of OPC are caused by the person's own Candida organisms which normally live in the mouth or digestive tract. A person has symptoms when overgrowth of Candida organisms occurs.

### **How Is OPC Diagnosed?**

OPC is diagnosed in two ways. A doctor may take a swab or sample of infected tissue and look at it under a microscope. If there is evidence of Candida infection, the sample will be cultured to confirm the diagnosis.

### **How Is OPC Treated?**

Prescription treatments such as, Oral fluconazole, clotrimazole troches, or nystatin suspension usually provide effective treatment for OPC.

## **What Will Happen If a Person Does Not Seek Treatment for OPC?**

Symptoms, which may be uncomfortable, may persist. In rare cases, invasive candidiasis may occur.

## **Can Candida-Causing OPC Become Resistant to Treatment?**

Overuse of antifungal medications can increase the chance that they will eventually not work (the fungus develops resistance to medications). Therefore, it is important to be sure of the diagnosis from before treating with over-the-counter or other antifungal medications.

## **Oropharyngeal Candidiasis: Technical Notes**

The Division of Bacterial and Mycotic Diseases of the CDC publishes summary information on oropharyngeal candidiasis for use by healthcare professionals and physicians. The information is presented in the form of notes. The notes are written in a rather technical language. A few medical expressions are particularly noteworthy. “Clinical features” generally cover the signs and symptoms of oropharyngeal candidiasis that can help the doctor with diagnosis. It may also include a discussion of the cause or “etiology” of oropharyngeal candidiasis. “Etiologic agent” signifies the particular organism, typically written in Latin, which causes or is associated with oropharyngeal candidiasis. “Reservoir” indicates the habitat or living environment of the organism. “Incidence” describes the number of people that are diagnosed with oropharyngeal candidiasis within a given population. “Sequelae” includes any related health consequences or secondary pathological conditions and diseases that may result from oropharyngeal candidiasis. “Transmission” describes how a disease spreads. “Risk Groups” are people who are most likely to be diagnosed with oropharyngeal candidiasis. “Surveillance” describes how oropharyngeal candidiasis is monitored by government officials across the population. “Challenges” and “Opportunities” are issues or areas where officials think progress might be made in understanding or combating oropharyngeal candidiasis in the future. The notes that follow were recently published by the CDC.<sup>8</sup>

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<sup>8</sup> Adapted from The Centers for Disease Control and Prevention (CDC): [http://www.cdc.gov/ncidod/dbmd/diseaseinfo/candidiasis\\_t.htm](http://www.cdc.gov/ncidod/dbmd/diseaseinfo/candidiasis_t.htm).

## **Clinical Features**

Oropharyngeal infection (OPC): white mucosal patches. Vulvovaginal infection (VVC): pruritus, vulval erythema, with or without discharge. Systemic infection usually presents as fever and chills unresponsive to antibacterial therapy. May manifest as renal or hepatosplenic infection, meningitis, endophthalmitis, endocarditis, osteomyelitis and/or arthritis.

## **Etiologic Agent**

*Candida albicans* and *C. glabrata*. Less commonly, *C. tropicalis*, *C. parapsilosis*, and *C. krusei*. Rarely, other *Candida* species.

## **Reservoir**

Forms part of the normal microbial flora of the mouth and gastrointestinal tract.

## **Incidence**

Fourth most common cause of nosocomial bloodstream infections. Incidence is 8 cases per 100,000 in the general population. Higher incidence among neonates and African-Americans. OPC used to be a common opportunistic infection in HIV-infected persons (prior to the introduction of HAART).

## **Sequelae**

None with appropriate antifungal therapy. Mortality rate is almost 40% with bloodstream and disseminated infection.

## **Transmission**

Most infections are endogenous in origin, but organisms can be transmitted on the hands of care givers.

### **Risk Groups**

Invasive disease occurs in critically ill patients in intensive-care units, in persons with severe granulocytopenia, and in hematopoietic stem cell and organ transplant recipients. OPC is often associated with HIV infection. VVC is often associated with pregnancy, diabetes mellitus, and antibiotic therapy.

### **Surveillance**

Nosocomial disease surveillance is conducted by NNIS in selected hospitals. Active population-based surveillance for candidemia is being conducted in selected U.S. sites.

### **Challenges**

Identifying modifiable risk factors for disease in immunocompromised and debilitated persons. Developing sensitive and specific methods for earlier diagnosis.

### **Opportunities**

Development of rapid antigenemia and antigenuria tests and molecular probes may facilitate earlier clinical diagnosis. Availability of molecular typing methods may assist in epidemiologic studies.

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## More Guideline Sources

The guideline above on oropharyngeal candidiasis 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 oropharyngeal candidiasis. 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 oropharyngeal candidiasis. 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. Recently, MEDLINEplus listed the following as being relevant to oropharyngeal candidiasis:

- Guides On oropharyngeal candidiasis

**Candidiasis**

<http://www.nlm.nih.gov/medlineplus/candidiasis.html>

- Other Guides

**Mouth Disorders**

<http://www.nlm.nih.gov/medlineplus/mouthdisorders.html>

**Throat Disorders**

<http://www.nlm.nih.gov/medlineplus/throatdisorders.html>

Within the health topic page dedicated to oropharyngeal candidiasis, the following was recently recommended to patients:

- **General/Overviews**

**Candidiasis: Diaper Rash, Oral Thrush, Vaginal Yeast Infection**

Source: Nemours Foundation

<http://kidshealth.org/parent/infections/common/candidiasis.html%20%20>

- **Diagnosis/Symptoms**

**Genital Problems in Men: Self-Care Flowcharts**

Source: American Academy of Family Physicians

<http://familydoctor.org/flowcharts/539.html>

**Genital Problems in Women: Self-Care Flowcharts**

Source: American Academy of Family Physicians

<http://familydoctor.org/flowcharts/537.html>

**Mouth Problems: Self-Care Flowcharts**

Source: American Academy of Family Physicians

<http://familydoctor.org/flowcharts/509.html>

- **Treatment**

**FDA Updates Safety Information for Miconazole Vaginal Cream and Suppositories**

Source: Food and Drug Administration

<http://www.fda.gov/bbs/topics/ANSWERS/2001/ANS01071.html>

- **Specific Conditions/Aspects**

- **Dubious &quot;Yeast Allergies&quot;**

- Source: Quackwatch, Inc.

- <http://www.quackwatch.com/01QuackeryRelatedTopics/candida.html>

- **Invasive Candidiasis**

- Source: National Center for Infectious Diseases

- [http://www.cdc.gov/ncidod/dbmd/diseaseinfo/candidiasis\\_inv\\_g.htm](http://www.cdc.gov/ncidod/dbmd/diseaseinfo/candidiasis_inv_g.htm)

- **Oropharyngeal Candidiasis (OPC, Thrush)**

- Source: National Center for Infectious Diseases

- [http://www.cdc.gov/ncidod/dbmd/diseaseinfo/candidiasis\\_opc\\_g.htm](http://www.cdc.gov/ncidod/dbmd/diseaseinfo/candidiasis_opc_g.htm)

- **Vaginal Yeast Infections**

- Source: American Academy of Family Physicians

- <http://familydoctor.org/handouts/206.html>

- **What is Oral Thrush?**

- Source: Mayo Foundation for Medical Education and Research

- <http://www.mayoclinic.com/invoke.cfm?id=DS00408>

- **Yeast Infections: When They Keep Coming Back**

- Source: American Academy of Family Physicians

- <http://familydoctor.org/handouts/597.html>

- **Children**

- **Yeast Infections (Thrush) in the Child Care Setting**

- Source: Centers for Disease Control and Prevention

- <http://www.cdc.gov/ncidod/hip/abc/facts43.htm>

- **Men**

- **Yeast Infection in Men**

- Source: Mayo Foundation for Medical Education and Research

- <http://www.mayoclinic.com/invoke.cfm?id=HO00172>

- **Organizations**

**National Center for Infectious Diseases, Division of Bacterial and Mycotic Diseases**

<http://www.cdc.gov/ncidod/dbmd/>

**National Institute of Allergy and Infectious Diseases**

<http://www.niaid.nih.gov/>

- **Research**

**Identification of Yeast Mating Habits Opens New Doors to Candida Research**

Source: National Institute of Allergy and Infectious Diseases

<http://www.niaid.nih.gov/newsroom/releases/candida.htm>

- **Teenagers**

**Yeast Infections**

Source: Nemours Foundation

[http://kidshealth.org/teen/infections/fungal/yeast\\_infections.html](http://kidshealth.org/teen/infections/fungal/yeast_infections.html)

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 the following: <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.

### **The Combined Health Information Database (CHID)**

CHID Online is a reference tool that maintains a database directory of thousands of journal articles and patient education guidelines on oropharyngeal candidiasis and related conditions. One of the advantages of CHID over other sources is that it offers summaries that describe the guidelines available, including contact information and pricing. CHID's general Web site is <http://chid.nih.gov/>. To search this database, go to <http://chid.nih.gov/detail/detail.html>. In particular, you can use the advanced search options to look up pamphlets, reports, brochures, and information kits. The following was recently posted in this archive:

- **Symptoms, Treatment, and Oral Thrush Prevention: Your Guide to Control**

Source: Mountain View, CA: Alza Pharmaceuticals. 1998. 10 p.

Contact: Available from Alza Pharmaceuticals. 1550 Plymouth Avenue, Mountain View, CA 94043. (800) 634-8977. PRICE: Single copy free; bulk orders available. Order Numbers: 0008291 or 0008485.

Summary: This brochure helps readers to prevent oral thrush (candidiasis). Oral thrush is an infection of the mouth by a yeast called *Candida*. Normally, the body's immune system keeps *Candida* in check. However, when the immune system is weakened (from chemotherapy, steroid therapy, HIV infection, or diabetes, for example), the person may be at risk for oral thrush. Written in a question and answer format, the brochure describes the symptoms of oral thrush, topical and systemic medications used to treat oral thrush, ways to lessen the discomfort of oral thrush, medications that can be used to prevent future infections, and daily self care steps to help control oral thrush. The brochure recommends that readers should check for symptoms daily, take all medications as prescribed, practice good oral hygiene (including regular dental checkups), avoid alcohol and foods that can aggravate oral thrush, and follow their physician's instructions. Two full color photographs show examples of *Candida* infections. 2 figures.

### **The National Guideline Clearinghouse™**

The National Guideline Clearinghouse™ offers hundreds of evidence-based clinical practice guidelines published in the United States and other countries. You can search their site located at <http://www.guideline.gov> by using the keyword “oropharyngeal candidiasis” or synonyms. The following was recently posted:

- **Practice guidelines for the treatment of candidiasis.**

Source: Infectious Diseases Society of America.; 2000 April; 17 pages

[http://www.guideline.gov/FRAMESETS/guideline\\_fs.asp?guideline=001896&sSearch\\_string=oropharyngeal+candidiasis](http://www.guideline.gov/FRAMESETS/guideline_fs.asp?guideline=001896&sSearch_string=oropharyngeal+candidiasis)

### **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 oropharyngeal candidiasis. 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<sup>®</sup>: <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/](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/](http://dmoz.org/Health/Conditions_and_Diseases/)
- Yahoo.com: [http://dir.yahoo.com/Health/Diseases\\_and\\_Conditions/](http://dir.yahoo.com/Health/Diseases_and_Conditions/)
- WebMD<sup>®</sup>Health: [http://my.webmd.com/health\\_topics](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:

**Antibacterial:** A substance that destroys bacteria or suppresses their growth or reproduction. [EU]

**Antibiotic:** A chemical substance produced by a microorganism which has the capacity, in dilute solutions, to inhibit the growth of or to kill other

microorganisms. Antibiotics that are sufficiently nontoxic to the host are used as chemotherapeutic agents in the treatment of infectious diseases of man, animals and plants. [EU]

**Antifungal:** Destructive to fungi, or suppressing their reproduction or growth; effective against fungal infections. [EU]

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

**Candidiasis:** Infection with a fungus of the genus *Candida*. It is usually a superficial infection of the moist cutaneous areas of the body, and is generally caused by *C. albicans*; it most commonly involves the skin (dermatocandidiasis), oral mucous membranes (thrush, def. 1), respiratory tract (bronchocandidiasis), and vagina (vaginitis). Rarely there is a systemic infection or endocarditis. Called also moniliasis, candidosis, oidiomycosis, and formerly blastodendriosis. [EU]

**Chemotherapy:** The treatment of disease by means of chemicals that have a specific toxic effect upon the disease - producing microorganisms or that selectively destroy cancerous tissue. [EU]

**Clotrimazole:** An imidazole derivative with a broad spectrum of antimycotic activity. It inhibits biosynthesis of the sterol ergosterol, an important component of fungal cell membranes. Its action leads to increased membrane permeability and apparent disruption of enzyme systems bound to the membrane. [NIH]

**Endocarditis:** Exudative and proliferative inflammatory alterations of the endocardium, characterized by the presence of vegetations on the surface of the endocardium or in the endocardium itself, and most commonly involving a heart valve, but sometimes affecting the inner lining of the cardiac chambers or the endocardium elsewhere. It may occur as a primary disorder or as a complication of or in association with another disease. [EU]

**Endogenous:** Developing or originating within the organisms or arising from causes within the organism. [EU]

**Endophthalmitis:** Suppurative inflammation of the tissues of the internal structures of the eye; not all layers of the uvea are affected. Fungi, necrosis of intraocular tumors, and retained intraocular foreign bodies often cause a purulent endophthalmitis. [NIH]

**Erythema:** A name applied to redness of the skin produced by congestion of the capillaries, which may result from a variety of causes, the etiology or a specific type of lesion often being indicated by a modifying term. [EU]

**Fluconazole:** Triazole antifungal agent that is used to treat oropharyngeal candidiasis and cryptococcal meningitis in AIDS. [NIH]

**Fungus:** A general term used to denote a group of eukaryotic protists,

including mushrooms, yeasts, rusts, moulds, smuts, etc., which are characterized by the absence of chlorophyll and by the presence of a rigid cell wall composed of chitin, mannans, and sometimes cellulose. They are usually of simple morphological form or show some reversible cellular specialization, such as the formation of pseudoparenchymatous tissue in the fruiting body of a mushroom. The dimorphic fungi grow, according to environmental conditions, as moulds or yeasts. [EU]

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

**Granulocytopenia:** Agranulocytosis. [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]

**Invasive:** 1. having the quality of invasiveness. 2. involving puncture or incision of the skin or insertion of an instrument or foreign material into the body; said of diagnostic techniques. [EU]

**Manifest:** Being the part or aspect of a phenomenon that is directly observable : concretely expressed in behaviour. [EU]

**Membrane:** A thin layer of tissue which covers a surface, lines a cavity or divides a space or organ. [EU]

**Meningitis:** Inflammation of the meninges. When it affects the dura mater, the disease is termed pachymeningitis; when the arachnoid and pia mater are involved, it is called leptomeningitis, or meningitis proper. [EU]

**Miconazole:** An imidazole antifungal agent that is used topically and by intravenous infusion. [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]

**Mycotic:** Pertaining to a mycosis; caused by fungi. [EU]

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

**Nosocomial:** Pertaining to or originating in the hospital, said of an infection not present or incubating prior to admittance to the hospital, but generally occurring 72 hours after admittance; the term is usually used to refer to patient disease, but hospital personnel may also acquire nosocomial infection. [EU]

**Nystatin:** Macrolide antifungal antibiotic complex produced by *Streptomyces noursei*, *S. aureus*, and other *Streptomyces* species. The

biologically active components of the complex are nystatin A1, A2, and A3. [NIH]

**Oral:** Pertaining to the mouth, taken through or applied in the mouth, as an oral medication or an oral thermometer. [EU]

**Osteomyelitis:** Inflammation of bone caused by a pyogenic organism. It may remain localized or may spread through the bone to involve the marrow, cortex, cancellous tissue, and periosteum. [EU]

**Pharmacists:** Those persons legally qualified by education and training to engage in the practice of pharmacy. [NIH]

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

**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]

**Steroid:** A group name for lipids that contain a hydrogenated cyclopentanoperhydrophenanthrene ring system. Some of the substances included in this group are progesterone, adrenocortical hormones, the gonadal hormones, cardiac aglycones, bile acids, sterols (such as cholesterol), toad poisons, saponins, and some of the carcinogenic hydrocarbons. [EU]

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

**Topical:** Pertaining to a particular surface area, as a topical anti-infective applied to a certain area of the skin and affecting only the area to which it is applied. [EU]

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



## CHAPTER 2. SEEKING GUIDANCE

### Overview

Some patients are comforted by the knowledge that a number of organizations dedicate their resources to helping people with oropharyngeal candidiasis. 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.<sup>9</sup> 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 oropharyngeal candidiasis. The chapter ends with a discussion on how to find a doctor that is right for you.

### Associations and Oropharyngeal Candidiasis

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.<sup>10</sup> 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

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<sup>9</sup> Churches, synagogues, and other houses of worship might also have groups that can offer you the social support you need.

<sup>10</sup> This section has been adapted from <http://www.ahcpr.gov/consumer/diagin5.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 oropharyngeal candidiasis. 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 "oropharyngeal candidiasis" (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 "oropharyngeal candidiasis". 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 “oropharyngeal candidiasis” (or synonyms) into the “For these words:” box, you will only receive results on organizations dealing with oropharyngeal candidiasis. 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 “oropharyngeal candidiasis” (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<sup>®</sup>, 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 oropharyngeal candidiasis 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:<sup>11</sup>

- 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.

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<sup>11</sup> This section is adapted from the AHRQ: [www.ahrq.gov/consumer/qntascii/qntdr.htm](http://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>.<sup>12</sup> 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.

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<sup>12</sup> 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<sup>13</sup>

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 oropharyngeal candidiasis?
- 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 oropharyngeal candidiasis?
- 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<sup>14</sup>

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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<sup>13</sup> This section has been adapted from the AHRQ:  
[www.ahrq.gov/consumer/qntascii/qntdr.htm](http://www.ahrq.gov/consumer/qntascii/qntdr.htm).

<sup>14</sup> This section has been adapted from the AHRQ:  
[www.ahrq.gov/consumer/qntascii/qntdr.htm](http://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:<sup>15</sup>

- 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>

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<sup>15</sup> You can access this information at:

<http://www.nlm.nih.gov/medlineplus/healthsystem.html>.



## CHAPTER 3. CLINICAL TRIALS AND OROPHARYNGEAL CANDIDIASIS

### Overview

Very few medical conditions have a single treatment. The basic treatment guidelines that your physician has discussed with you, or those that you have found using the techniques discussed in Chapter 1, may provide you with all that you will require. For some patients, current treatments can be enhanced with new or innovative techniques currently under investigation. In this chapter, we will describe how clinical trials work and show you how to keep informed of trials concerning oropharyngeal candidiasis.

### What Is a Clinical Trial?<sup>16</sup>

Clinical trials involve the participation of people in medical research. Most medical research begins with studies in test tubes and on animals. Treatments that show promise in these early studies may then be tried with people. The only sure way to find out whether a new treatment is safe, effective, and better than other treatments for oropharyngeal candidiasis is to try it on patients in a clinical trial.

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<sup>16</sup> The discussion in this chapter has been adapted from the NIH and the NEI: [www.nei.nih.gov/netrials/ctivr.htm](http://www.nei.nih.gov/netrials/ctivr.htm).

## What Kinds of Clinical Trials Are There?

Clinical trials are carried out in three phases:

- **Phase I.** Researchers first conduct Phase I trials with small numbers of patients and healthy volunteers. If the new treatment is a medication, researchers also try to determine how much of it can be given safely.
- **Phase II.** Researchers conduct Phase II trials in small numbers of patients to find out the effect of a new treatment on oropharyngeal candidiasis.
- **Phase III.** Finally, researchers conduct Phase III trials to find out how new treatments for oropharyngeal candidiasis compare with standard treatments already being used. Phase III trials also help to determine if new treatments have any side effects. These trials--which may involve hundreds, perhaps thousands, of people--can also compare new treatments with no treatment.

## How Is a Clinical Trial Conducted?

Various organizations support clinical trials at medical centers, hospitals, universities, and doctors' offices across the United States. The "principal investigator" is the researcher in charge of the study at each facility participating in the clinical trial. Most clinical trial researchers are medical doctors, academic researchers, and specialists. The "clinic coordinator" knows all about how the study works and makes all the arrangements for your visits.

All doctors and researchers who take part in the study on oropharyngeal candidiasis carefully follow a detailed treatment plan called a protocol. This plan fully explains how the doctors will treat you in the study. The "protocol" ensures that all patients are treated in the same way, no matter where they receive care.

Clinical trials are controlled. This means that researchers compare the effects of the new treatment with those of the standard treatment. In some cases, when no standard treatment exists, the new treatment is compared with no treatment. Patients who receive the new treatment are in the treatment group. Patients who receive a standard treatment or no treatment are in the "control" group. In some clinical trials, patients in the treatment group get a new medication while those in the control group get a placebo. A placebo is a harmless substance, a "dummy" pill, that has no effect on oropharyngeal candidiasis. In other clinical trials, where a new surgery or device (not a medicine) is being tested, patients in the control group may receive a "sham

treatment.” This treatment, like a placebo, has no effect on oropharyngeal candidiasis and does not harm patients.

Researchers assign patients “randomly” to the treatment or control group. This is like flipping a coin to decide which patients are in each group. If you choose to participate in a clinical trial, you will not know which group you will be appointed to. The chance of any patient getting the new treatment is about 50 percent. You cannot request to receive the new treatment instead of the placebo or sham treatment. Often, you will not know until the study is over whether you have been in the treatment group or the control group. This is called a “masked” study. In some trials, neither doctors nor patients know who is getting which treatment. This is called a “double masked” study. These types of trials help to ensure that the perceptions of the patients or doctors will not affect the study results.

### **Natural History Studies**

Unlike clinical trials in which patient volunteers may receive new treatments, natural history studies provide important information to researchers on how oropharyngeal candidiasis develops over time. A natural history study follows patient volunteers to see how factors such as age, sex, race, or family history might make some people more or less at risk for oropharyngeal candidiasis. A natural history study may also tell researchers if diet, lifestyle, or occupation affects how a disease or disorder develops and progresses. Results from these studies provide information that helps answer questions such as: How fast will a disease or disorder usually progress? How bad will the condition become? Will treatment be needed?

### **What Is Expected of Patients in a Clinical Trial?**

Not everyone can take part in a clinical trial for a specific disease or disorder. Each study enrolls patients with certain features or eligibility criteria. These criteria may include the type and stage of disease or disorder, as well as, the age and previous treatment history of the patient. You or your doctor can contact the sponsoring organization to find out more about specific clinical trials and their eligibility criteria. If you are interested in joining a clinical trial, your doctor must contact one of the trial’s investigators and provide details about your diagnosis and medical history.

If you participate in a clinical trial, you may be required to have a number of medical tests. You may also need to take medications and/or undergo

surgery. Depending upon the treatment and the examination procedure, you may be required to receive inpatient hospital care. Or, you may have to return to the medical facility for follow-up examinations. These exams help find out how well the treatment is working. Follow-up studies can take months or years. However, the success of the clinical trial often depends on learning what happens to patients over a long period of time. Only patients who continue to return for follow-up examinations can provide this important long-term information.

## Recent Trials on Oropharyngeal Candidiasis

The National Institutes of Health and other organizations sponsor trials on various diseases and disorders. Because funding for research goes to the medical areas that show promising research opportunities, it is not possible for the NIH or others to sponsor clinical trials for every disease and disorder at all times. The following lists recent trials dedicated to oropharyngeal candidiasis.<sup>17</sup> If the trial listed by the NIH is still recruiting, you may be eligible. If it is no longer recruiting or has been completed, then you can contact the sponsors to learn more about the study and, if published, the results. Further information on the trial is available at the Web site indicated. Please note that some trials may no longer be recruiting patients or are otherwise closed. Before contacting sponsors of a clinical trial, consult with your physician who can help you determine if you might benefit from participation.

- **A Comparison of SCH 56592 and Fluconazole in the Treatment of Oropharyngeal Candidiasis (OPC) in HIV-Positive Patients**

Condition(s): Candidiasis, Oral; HIV Infections

Study Status: This study is no longer recruiting patients.

Sponsor(s): Schering-Plough

Purpose - Excerpt: The purpose of this study is to compare the safety and effectiveness of SCH 56592 with that of fluconazole in the treatment of OPC (a fungal infection of the throat) in HIV-positive patients.

Phase(s): Phase II

Study Type: Interventional

Contact(s): see Web site below

Web Site:

<http://clinicaltrials.gov/ct/gui/show/NCT00002399;jsessionid=1354A52083809576F4D3D381C1571375>

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<sup>17</sup> These are listed at [www.ClinicalTrials.gov](http://www.ClinicalTrials.gov).

- **A Randomized, Prospective, Double-Blind Study Comparing Fluconazole With Placebo for Primary and Secondary Prophylaxis of Mucosal Candidiasis in HIV-Infected Women**

Condition(s): Candidiasis; Candidiasis, esophageal; HIV Infections

Study Status: This study is no longer recruiting patients.

Sponsor(s): National Institute of Allergy and Infectious Diseases (NIAID); Pfizer

Purpose - Excerpt: To compare the efficacy of fluconazole versus placebo for the prevention of Candida esophagitis and vaginal/oropharyngeal candidiasis, including a comparison of the development of clinical resistance. Fluconazole has been shown to be effective in preventing or suppressing candidiasis in HIV-negative women. An increasing likelihood of oral and esophageal candidiasis in conjunction with progressive immunosuppression raises the question of the potential role of prophylactic antifungal therapy in high-risk persons.

Study Type: Interventional

Contact(s): see Web site below

Web Site:

<http://clinicaltrials.gov/ct/gui/show/NCT00000744;jsessionid=1354A52083809576F4D3D381C1571375>

- **A Study to Compare the Use of Fluconazole as Continuous Therapy Versus Periodic Therapy in HIV-Positive Patients with Recurrent Thrush**

Condition(s): Candidiasis, Oral; HIV Infections

Study Status: This study is no longer recruiting patients.

Sponsor(s): National Institute of Allergy and Infectious Diseases (NIAID)

Purpose - Excerpt: The purpose of this study is to determine whether it is better to treat patients with fluconazole on a continuous basis to prevent thrush (yeast infection in the mouth) from coming back or to wait and treat each episode of thrush. Fluconazole is one of the most commonly prescribed drugs to treat thrush and other yeast infections. However, the number of patients with fluconazole-resistant thrush is increasing, and it is not known whether continuous or intermittent use of fluconazole leads to greater resistance. Therefore, it is important to determine the most effective treatment strategy.

Phase(s): Phase IV

Study Type: Interventional

Contact(s): see Web site below

Web Site:

<http://clinicaltrials.gov/ct/gui/show/NCT00000951;jsessionid=1354A52083809576F4D3D381C1571375>

- **An Open Study of the Effect of Itraconazole Oral Solution for the Treatment of Fluconazole Refractory Oropharyngeal Candidiasis in HIV-Positive Subjects.**

Condition(s): Candidiasis, Oral; HIV Infections

Study Status: This study is no longer recruiting patients.

Sponsor(s): Janssen Pharmaceutica

Purpose - Excerpt: To assess the efficacy and safety of itraconazole oral solution in HIV-seropositive patients with oropharyngeal candidiasis that is refractory to fluconazole.

Study Type: Interventional

Contact(s): see Web site below

Web Site:

<http://clinicaltrials.gov/ct/gui/show/NCT00002133;jsessionid=1354A52083809576F4D3D381C1571375>

- **Comparative Randomized Study of the Efficacy, Safety, and Toleration of Fluconazole Oral Suspension or Nystatin Oral Suspension in the Treatment of Patients With Oropharyngeal Candidiasis in Association With the Acquired Immunodeficiency Syndrome**

Condition(s): Candidiasis, Oral; HIV Infections

Study Status: This study is no longer recruiting patients.

Sponsor(s): Pfizer

Purpose - Excerpt: To compare the efficacy, safety, and toleration of fluconazole as a single daily oral suspension for 14 days versus nystatin oral suspension 4 times daily for 14 days in the treatment of oropharyngeal candidiasis in patients with AIDS or HIV infection.

Study Type: Interventional

Contact(s): California; California Med Research Group, Fresno, California, 93726, United States; UCSF Hosp, San Francisco, California, 94143, United States; Maryland; Johns Hopkins School of Medicine, Baltimore, Maryland, 21205, United States; Pennsylvania; Med College of Pennsylvania, Philadelphia, Pennsylvania, 19129, United States; Virginia; Hampton Roads Med Specialists, Hampton, Virginia, 23666, United States

Web Site:

<http://clinicaltrials.gov/ct/gui/show/NCT00002112;jsessionid=1354A52083809576F4D3D381C1571375>

- **Dapsone 100 mg Versus 50 as Primary Prophylaxis for Pneumocystis carinii Pneumonia (PCP) in Patients With AIDS-Related Complex (ARC)**

Condition(s): Pneumonia, Pneumocystis carinii; HIV Infections

Study Status: This study is no longer recruiting patients.

Sponsor(s): Jacobus Pharmaceutical

Purpose - Excerpt: To determine which of 2 doses of dapsone is effective prophylaxis for Pneumocystis carinii pneumonia (PCP) in patients with oral thrush or hairy leukoplakia and less than 400 CD4 lymphocytes per mm<sup>3</sup>. To determine whether the long-term toxicities associated with daily dapsone in this population are tolerable.

Study Type: Interventional

Contact(s): California; UCLA CARE Ctr, Los Angeles, California, 90095, United States

Web Site:

<http://clinicaltrials.gov/ct/gui/show/NCT00002043;jsessionid=1354A52083809576F4D3D381C1571375>

- **Safety and Effectiveness of Fluconazole Versus SCH 56592 to Treat Thrush in HIV-Positive Patients**

Condition(s): Candidiasis, Oral; HIV Infections

Study Status: This study is no longer recruiting patients.

Sponsor(s): Schering-Plough

Purpose - Excerpt: The purpose of this study is to compare the safety and effectiveness of 2 treatments for thrush (a fungal infection of the mouth and throat) in HIV-positive patients. Fluconazole is a drug that is commonly used to treat thrush. SCH 56592 is a new drug that will be compared to fluconazole.

Phase(s): Phase III

Study Type: Interventional

Contact(s): see Web site below

Web Site:

<http://clinicaltrials.gov/ct/gui/show/NCT00002446;jsessionid=1354A52083809576F4D3D381C1571375>

- **Safety and Effectiveness of Giving Lamisil to HIV-Positive Subjects With Thrush Who Have Not Responded to Fluconazole Treatment**

Condition(s): Candidiasis, Oral; HIV Infections

Study Status: This study is no longer recruiting patients.

Sponsor(s): Novartis Pharmaceuticals

Purpose - Excerpt: The purpose of this study is to see if it is safe and effective to give Lamisil to HIV-positive patients with thrush (a fungal infection) that has not responded to fluconazole.

Study Type: Interventional

Contact(s): see Web site below

Web Site:

<http://clinicaltrials.gov/ct/gui/show/NCT00002394;jsessionid=1354A52083809576F4D3D381C1571375>

- **A Study of Amphotericin B in the Treatment of Fungal Infections of the Mouth in HIV-Infected Patients Who Have Not Had Success with Fluconazole**

Condition(s): Candidiasis, Oral; HIV Infections

Study Status: This study is completed.

Sponsor(s): National Institute of Allergy and Infectious Diseases (NIAID); Bristol-Myers Squibb

Purpose - Excerpt: To assess response and toxicity in patients with fluconazole-resistant oral candidiasis ( thrush ) when given initial induction with amphotericin B oral suspension. Experience with amphotericin B oral suspension for drug-sensitive thrush in HIV-infected patients is limited but encouraging.

Phase(s): Phase II

Study Type: Interventional

Contact(s): see Web site below

Web Site:

<http://clinicaltrials.gov/ct/gui/show/NCT00001065;jsessionid=1354A52083809576F4D3D381C1571375>

- **Fluconazole Prophylaxis of Thrush in AIDS**

Condition(s): Acquired Immunodeficiency Syndrome; Candidiasis; Oral Candidiasis

Study Status: This study is completed.

Sponsor(s): National Institute of Allergy and Infectious Diseases (NIAID)

Purpose - Excerpt: This is a placebo-controlled trial of intermittent fluconazole prophylaxis (200 mg orally three times a week) in the prevention of thrush.

Phase(s): Phase IV

Study Type: Interventional

Contact(s): Maryland; National Institute of Allergy and Infectious Diseases (NIAID), 9000 Rockville Pike Bethesda, Maryland, 20892, United States

Web Site:

<http://clinicaltrials.gov/ct/gui/show/NCT00001542;jsessionid=1354A52083809576F4D3D381C1571375>

- **Randomized Comparative Study of Fluconazole Versus Clotrimazole Troches in the Prevention of Serious Fungal Infection in Patients With AIDS or Advanced AIDS-Related Complex. (A Nested Study of ACTG 081)**

Condition(s): Candidiasis; Mycoses; HIV Infections

Study Status: This study is completed.

Sponsor(s): Pfizer; National Institute of Allergy and Infectious Diseases (NIAID)

Purpose - Excerpt: To study the effectiveness, safety, and tolerance of fluconazole versus clotrimazole troches (lozenges) as prophylaxis (preventive treatment) against fungal infections in patients enrolled in ACTG 081 (a study of prophylaxis against pneumocystosis, toxoplasmosis, and serious bacterial infection). Primarily, to compare the rates of invasive infections by *C. neoformans*, endemic mycoses, and *Candida*. To compare the mortality rates due to fungal infections between two antifungal prophylactic treatments. Secondarily, to assess the effect of prophylaxis on the incidence of severe fungal infections, defined as invasive infections and esophageal candidiasis and less severe mucocutaneous infection. Serious fungal infections are significant complicating and life-threatening occurrences in patients with advanced HIV infection. Oropharyngeal candidiasis is found in almost all such patients, and causes pain, difficulty in swallowing, and loss of appetite. Similarly, esophageal candidiasis causes illness in the population. Cryptococcosis, endemic mycoses, and coccidioidomycosis also cause significant illness and death in AIDS patients. Once established, fungal infections in AIDS patients generally require continuous suppressive therapy because attempts at curing these infections are usually

unsuccessful. Fluconazole has a number of characteristics that would make it a logical candidate to examine as a prophylactic agent in patients with advanced HIV infection. Animal studies have shown it to be prophylactic in models of candidiasis, cryptococcosis, histoplasmosis, and coccidioidomycosis. Initial experience in patients with active cryptococcal meningitis appears favorable, and studies of oropharyngeal candidiasis show it to be effective.

Phase(s): Phase III

Study Type: Interventional

Contact(s): see Web site below

Web Site:

<http://clinicaltrials.gov/ct/gui/show/NCT00000676;jsessionid=1354A52083809576F4D3D381C1571375>

- **Safety and Effectiveness of Giving L-743,872 to Patients with Thrush That Has Not Been Cured With Fluconazole**

Condition(s): Candidiasis, Oral; HIV Infections

Study Status: This study is terminated.

Sponsor(s): Merck Research Laboratories

Purpose - Excerpt: The purpose of this study is to see if it is safe and effective to give L-743,872 to patients with thrush, an AIDS-related yeast infection of the mouth, that has not been cured with fluconazole treatment.

Phase(s): Phase II

Study Type: Interventional

Contact(s): Carol Sable; New Jersey; Carol Sable, Rahway, New Jersey, 07065, United States

Web Site:

<http://clinicaltrials.gov/ct/gui/show/NCT00005920;jsessionid=1354A52083809576F4D3D381C1571375>

## Benefits and Risks<sup>18</sup>

### What Are the Benefits of Participating in a Clinical Trial?

If you are interested in a clinical trial, it is important to realize that your participation can bring many benefits to you and society at large:

- A new treatment could be more effective than the current treatment for oropharyngeal candidiasis. Although only half of the participants in a clinical trial receive the experimental treatment, if the new treatment is proved to be more effective and safer than the current treatment, then those patients who did not receive the new treatment during the clinical trial may be among the first to benefit from it when the study is over.
- If the treatment is effective, then it may improve health or prevent diseases or disorders.
- Clinical trial patients receive the highest quality of medical care. Experts watch them closely during the study and may continue to follow them after the study is over.
- People who take part in trials contribute to scientific discoveries that may help other people with oropharyngeal candidiasis. In cases where certain diseases or disorders run in families, your participation may lead to better care or prevention for your family members.

### The Informed Consent

Once you agree to take part in a clinical trial, you will be asked to sign an “informed consent.” This document explains a clinical trial’s risks and benefits, the researcher’s expectations of you, and your rights as a patient.

### What Are the Risks?

Clinical trials may involve risks as well as benefits. Whether or not a new treatment will work cannot be known ahead of time. There is always a chance that a new treatment may not work better than a standard treatment. There is also the possibility that it may be harmful. The treatment you receive may cause side effects that are serious enough to require medical attention.

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<sup>18</sup> This section has been adapted from ClinicalTrials.gov, a service of the National Institutes of Health:  
[http://www.clinicaltrials.gov/ct/gui/c/a1r/info/whatis?JServSessionIdzone\\_ct=9jmun6f291](http://www.clinicaltrials.gov/ct/gui/c/a1r/info/whatis?JServSessionIdzone_ct=9jmun6f291).

### **How Is Patient Safety Protected?**

Clinical trials can raise fears of the unknown. Understanding the safeguards that protect patients can ease some of these fears. Before a clinical trial begins, researchers must get approval from their hospital's Institutional Review Board (IRB), an advisory group that makes sure a clinical trial is designed to protect patient safety. During a clinical trial, doctors will closely watch you to see if the treatment is working and if you are experiencing any side effects. All the results are carefully recorded and reviewed. In many cases, experts from the Data and Safety Monitoring Committee carefully monitor each clinical trial and can recommend that a study be stopped at any time. You will only be asked to take part in a clinical trial as a volunteer giving informed consent.

### **What Are a Patient's Rights in a Clinical Trial?**

If you are eligible for a clinical trial, you will be given information to help you decide whether or not you want to participate. As a patient, you have the right to:

- Information on all known risks and benefits of the treatments in the study.
- Know how the researchers plan to carry out the study, for how long, and where.
- Know what is expected of you.
- Know any costs involved for you or your insurance provider.
- Know before any of your medical or personal information is shared with other researchers involved in the clinical trial.
- Talk openly with doctors and ask any questions.

After you join a clinical trial, you have the right to:

- Leave the study at any time. Participation is strictly voluntary. However, you should not enroll if you do not plan to complete the study.
- Receive any new information about the new treatment.
- Continue to ask questions and get answers.
- Maintain your privacy. Your name will not appear in any reports based on the study.

- Know whether you participated in the treatment group or the control group (once the study has been completed).

### **What about Costs?**

In some clinical trials, the research facility pays for treatment costs and other associated expenses. You or your insurance provider may have to pay for costs that are considered standard care. These things may include inpatient hospital care, laboratory and other tests, and medical procedures. You also may need to pay for travel between your home and the clinic. You should find out about costs before committing to participation in the trial. If you have health insurance, find out exactly what it will cover. If you don't have health insurance, or if your insurance company will not cover your costs, talk to the clinic staff about other options for covering the cost of your care.

### **What Questions Should You Ask before Deciding to Join a Clinical Trial?**

Questions you should ask when thinking about joining a clinical trial include the following:

- What is the purpose of the clinical trial?
- What are the standard treatments for oropharyngeal candidiasis? Why do researchers think the new treatment may be better? What is likely to happen to me with or without the new treatment?
- What tests and treatments will I need? Will I need surgery? Medication? Hospitalization?
- How long will the treatment last? How often will I have to come back for follow-up exams?
- What are the treatment's possible benefits to my condition? What are the short- and long-term risks? What are the possible side effects?
- Will the treatment be uncomfortable? Will it make me feel sick? If so, for how long?
- How will my health be monitored?
- Where will I need to go for the clinical trial? How will I get there?
- How much will it cost to be in the study? What costs are covered by the study? How much will my health insurance cover?
- Will I be able to see my own doctor? Who will be in charge of my care?

- Will taking part in the study affect my daily life? Do I have time to participate?
- How do I feel about taking part in a clinical trial? Are there family members or friends who may benefit from my contributions to new medical knowledge?

## Keeping Current on Clinical Trials

Various government agencies maintain databases on trials. The U.S. National Institutes of Health, through the National Library of Medicine, has developed [ClinicalTrials.gov](http://ClinicalTrials.gov) to provide patients, family members, and physicians with current information about clinical research across the broadest number of diseases and conditions.

The site was launched in February 2000 and currently contains approximately 5,700 clinical studies in over 59,000 locations worldwide, with most studies being conducted in the United States. [ClinicalTrials.gov](http://ClinicalTrials.gov) receives about 2 million hits per month and hosts approximately 5,400 visitors daily. To access this database, simply go to their Web site ([www.clinicaltrials.gov](http://www.clinicaltrials.gov)) and search by “oropharyngeal candidiasis” (or synonyms).

While [ClinicalTrials.gov](http://ClinicalTrials.gov) is the most comprehensive listing of NIH-supported clinical trials available, not all trials are in the database. The database is updated regularly, so clinical trials are continually being added. The following is a list of specialty databases affiliated with the National Institutes of Health that offer additional information on trials:

- For clinical studies at the Warren Grant Magnuson Clinical Center located in Bethesda, Maryland, visit their Web site:  
<http://clinicalstudies.info.nih.gov/>
- For clinical studies conducted at the Bayview Campus in Baltimore, Maryland, visit their Web site:  
<http://www.jhbmc.jhu.edu/studies/index.html>
- For trials on infectious, immune, and allergic diseases, visit the site of the National Institute of Allergy and Infectious Diseases:  
<http://www.niaid.nih.gov/clintrials/>

## General References

The following references describe clinical trials and experimental medical research. They have been selected to ensure that they are likely to be available from your local or online bookseller or university medical library. These references are usually written for healthcare professionals, so you may consider consulting with a librarian or bookseller who might recommend a particular reference. The following includes some of the most readily available references (sorted alphabetically by title; hyperlinks provide rankings, information and reviews at Amazon.com):

- **A Guide to Patient Recruitment : Today's Best Practices & Proven Strategies** by Diana L. Anderson; Paperback - 350 pages (2001), CenterWatch, Inc.; ISBN: 1930624115;  
<http://www.amazon.com/exec/obidos/ASIN/1930624115/icongroupinterna>
- **A Step-By-Step Guide to Clinical Trials** by Marilyn Mulay, R.N., M.S., OCN; Spiral-bound - 143 pages Spiral edition (2001), Jones & Bartlett Pub; ISBN: 0763715697;  
<http://www.amazon.com/exec/obidos/ASIN/0763715697/icongroupinterna>
- **The CenterWatch Directory of Drugs in Clinical Trials** by CenterWatch; Paperback - 656 pages (2000), CenterWatch, Inc.; ISBN: 0967302935;  
<http://www.amazon.com/exec/obidos/ASIN/0967302935/icongroupinterna>
- **The Complete Guide to Informed Consent in Clinical Trials** by Terry Hartnett (Editor); Paperback - 164 pages (2000), PharmSource Information Services, Inc.; ISBN: 0970153309;  
<http://www.amazon.com/exec/obidos/ASIN/0970153309/icongroupinterna>
- **Dictionary for Clinical Trials** by Simon Day; Paperback - 228 pages (1999), John Wiley & Sons; ISBN: 0471985961;  
<http://www.amazon.com/exec/obidos/ASIN/0471985961/icongroupinterna>
- **Extending Medicare Reimbursement in Clinical Trials** by Institute of Medicine Staff (Editor), et al; Paperback 1st edition (2000), National Academy Press; ISBN: 0309068886;  
<http://www.amazon.com/exec/obidos/ASIN/0309068886/icongroupinterna>
- **Handbook of Clinical Trials** by Marcus Flather (Editor); Paperback (2001), Remedica Pub Ltd; ISBN: 1901346293;  
<http://www.amazon.com/exec/obidos/ASIN/1901346293/icongroupinterna>

## Vocabulary Builder

The following vocabulary builder gives definitions of words used in this chapter that have not been defined in previous chapters:

**Cryptococcosis:** Infection with a fungus of the species *Cryptococcus neoformans*. [NIH]

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

**Esophagitis:** Inflammation, acute or chronic, of the esophagus caused by bacteria, chemicals, or trauma. [NIH]

**Induction:** The act or process of inducing or causing to occur, especially the production of a specific morphogenetic effect in the developing embryo through the influence of evocators or organizers, or the production of anaesthesia or unconsciousness by use of appropriate agents. [EU]

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

**Itraconazole:** An antifungal agent that has been used in the treatment of histoplasmosis, blastomycosis, cryptococcal meningitis, and aspergillosis. [NIH]

**Mucocutaneous:** Pertaining to or affecting the mucous membrane and the skin. [EU]

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

**Progressive:** Advancing; going forward; going from bad to worse; increasing in scope or severity. [EU]

**Refractory:** Not readily yielding to treatment. [EU]

**Suppressive:** Tending to suppress : effecting suppression; specifically : serving to suppress activity, function, symptoms. [EU]

**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]

**Toxoplasmosis:** An acute or chronic, widespread disease of animals and humans caused by the obligate intracellular protozoon *Toxoplasma gondii*, transmitted by oocysts containing the pathogen in the feces of cats (the definitive host), usually by contaminated soil, direct exposure to infected feces, tissue cysts in infected meat, or tachyzoites (proliferating forms) in blood. [EU]

## **PART II: ADDITIONAL RESOURCES AND ADVANCED MATERIAL**

### **ABOUT PART II**

In Part II, we introduce you to additional resources and advanced research on oropharyngeal candidiasis. 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 oropharyngeal candidiasis. In Part II, as in Part I, our objective is not to interpret the latest advances on oropharyngeal candidiasis 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 oropharyngeal candidiasis is suggested.



## CHAPTER 4. STUDIES ON OROPHARYNGEAL CANDIDIASIS

### Overview

Every year, academic studies are published on oropharyngeal candidiasis 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 oropharyngeal candidiasis. 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 oropharyngeal candidiasis and teach you how to keep current on new studies as they are published or undertaken by the scientific community.

### The Combined Health Information Database

The Combined Health Information Database summarizes studies across numerous federal agencies. To limit your investigation to research studies and oropharyngeal candidiasis, you will need to use the advanced search options. First, go to <http://chid.nih.gov/index.html>. From there, select the “Detailed Search” option (or go directly to that page with the following hyperlink: <http://chid.nih.gov/detail/detail.html>). The trick in extracting studies is found in 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 "Journal Article." At the top of the search form, select the number of records you would like to see (we recommend 100) and check the box to display "whole records." We recommend that you type in "oropharyngeal candidiasis" (or synonyms) into the "For these words:" box. Consider using the option "anywhere in record" to make your search as broad as possible. If you want to limit the search to only a particular field, such as the title of the journal, then select this option in the "Search in these fields" drop box. The following is a sample of what you can expect from this type of search:

- **Epidemiology of Non-Albicans Candida in Oropharyngeal Candidiasis in HIV Patients**

Source: SCD. *Special Care in Dentistry*. 20(5): 178-181. September-October 2000.

Contact: Available from Special Care Dentistry. 211 East Chicago Avenue, Chicago, IL 60611. (312) 440-2660. Fax (312) 440-2824.

Summary: Oropharyngeal candidiasis (OPC) is the most common fungal infection in patients with HIV infection. The most common organism isolated in OPC is *C. albicans*, however, this article explores the epidemiology (causes) of non-albicans *Candida* in oropharyngeal candidiasis in HIV patients. Fluconazole has been proven to be very effective in treating this infection, but decreased susceptibility of *Candida* to this drug has emerged. Certain non-albicans species such as *C. glabrata* and *C. krusei* are commonly less susceptible to fluconazole than *C. albicans* and are being isolated with increased frequency in HIV patients. The authors report on a study undertaken to determine if the presence of non-albicans *Candida* with OPC in HIV patients had an impact on clinical presentation. The results show that late stage HIV patients have a high prevalence of *Candida* with decreased susceptibility to fluconazole, especially non-albicans species. OPC episodes with non-albicans isolates were more likely to require higher doses of fluconazole to achieve clinical care. Also, the presence of non-albicans *Candida* was more frequently associated with severe symptoms. 4 figures. 1 table. 17 references.

- **Oropharyngeal Candidosis in the Older Patient**

Source: *Journal of the American Geriatrics Society*. 45(7): 863-870. July 1997.

Summary: This article provides non-dental clinicians managing older patients a review of the clinical characteristics, risk factors, diagnosis, and management of oropharyngeal candidosis in older adults. Colonization

of the oral and pharyngeal regions by *Candida* species, particularly *C. albicans*, is extremely common in humans, particularly in early and late life. Its occurrence represents a local or systemic breakdown in normal host defenses, making its appearance an alarm that should not be ignored. A variety of local and systemic conditions predispose the transformation of the benign colonization to a pathological state, which may have severe local or serious systemic consequences. The finding of oropharyngeal candidosis in an older patient, therefore, merits investigation of the likely host factors responsible for the organism adopting its pathogenic behavior. Management strategies are outlined for denture care, care of the intraoral mucosa, and care of lip commissures (angular cheilitis). Cases of oral candidosis that appear not to be complicated by systemic factors are generally managed through improvement of oral hygiene and the use of topical antifungal rinses on a schedule of four times a day for two weeks. Good oral hygiene consists of the care and cleaning of the dentition (including dentures), soft tissue, and tongue. 1 figure. 4 tables. 70 references. (AA-M).

- **Systematic Review of the Effectiveness of Antifungal Drugs for the Prevention and Treatment of Oropharyngeal Candidiasis in HIV-positive Patients**

Source: *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontics*. 92(2): 170-179. August 2001.

Contact: Available from Mosby, Inc. 6277 Sea Harbor Drive, Orlando, FL 32887-4800. (800) 654-2452 or (407) 345-4000. Website: [www.harcourthealth.com](http://www.harcourthealth.com).

Summary: This article reports on a systematic review of randomized clinical trials (published between 1966 and 2000) that was undertaken to determine the strength of evidence for the effectiveness of antifungal drugs (nystatin, clotrimazole, amphotericin B, fluconazole, ketoconazole, and itraconazole) to prevent and treat oral candidiasis (thrush, a fungal infection) in patients who are HIV positive. The automated database search identified 366 articles; six met inclusion and exclusion criteria with respect to prophylaxis (prevention), and 12 met criteria for treatment of oral candidiasis. The results showed that evidence for the prophylactic effectiveness of fluconazole is good, although insufficient to draw conclusions about the other antifungals. Evidence for treatment effectiveness is insufficient for amphotericin B but good for nystatin, clotrimazole, fluconazole, ketoconazole, and itraconazole. The authors also offer suggestions for strengthening the evidence base: use of larger, more well defined groups; control for immunologic status; viral load; history of oral candidiasis; past exposure to antifungals; baseline oral

Candida carriage; drug interactions; and antiretroviral therapy; and consistent use of compliance monitors, fungal speciation, and susceptibility testing. 3 tables. 33 references.

## Federally-Funded Research on Oropharyngeal Candidiasis

The U.S. Government supports a variety of research studies relating to oropharyngeal candidiasis and associated conditions. These studies are tracked by the Office of Extramural Research at the National Institutes of Health.<sup>19</sup> 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](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 oropharyngeal candidiasis 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 oropharyngeal candidiasis 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 oropharyngeal candidiasis:

- **Project Title: ACTG 323 Fluconazole as Therapy for Oropharyngeal Candidiasis**

Principal Investigator & Institution: Schooley, Robert T.; ; University of Colorado Hlth Sciences Ctr 4200 E 9Th Ave Denver, Co 80262

Timing: Fiscal Year 2000

Summary: This study will explore treatment strategies in HIV-infected individuals who have recurrent oropharyngeal candidiasis. It will explore using fluconazole only when infection is present (episodic) versus continuous fluconazole therapy to see if there is a difference in terms of frequency of infections and frequency of fluconazole-resistant

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<sup>19</sup> 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).

infections. This investigator-initiated, National Institute of Health sponsored, multicenter Phase IV study to compare the effects that management strategies, episodic versus continuous suppression, have on oropharyngeal candidiasis before the development of clinically significant fluconazole-refractory infections, infections that are unresponsive to treatment. Subjects to be enrolled are those with an active episode of oropharyngeal candidiasis or subjects with a history of at least one prior episode of oropharyngeal candidiasis within the last six months and CD4+ count < 150 cells/mm<sup>3</sup> without prior extensive azole, family of antifungal drugs used to treat candida, exposure. Subjects will be followed for two years after the last subject has been enrolled to evaluate the long-term effects of the treatment strategies on the development of fluconazole-refractory thrush. The design allows for increased dosing of continuous fluconazole for individuals with frequent infections or esophageal candidiasis and continuous fluconazole treatment for those initially assigned to episodic therapy who experience frequent oropharyngeal or esophageal candidiasis.

Website: [http://commons.cit.nih.gov/crisp3/CRISP.Generate\\_Ticket](http://commons.cit.nih.gov/crisp3/CRISP.Generate_Ticket)

- **Project Title: Fluconazole in HIV PTS W/ Oropharyngeal Candidiasis**

Principal Investigator & Institution: Kelly, Meera J.; ; University of North Carolina Chapel Hill Box 2688, 910 Raleigh Rd Chapel Hill, Nc 27515

Timing: Fiscal Year 2000

Summary: This abstract is not available.

Website: [http://commons.cit.nih.gov/crisp3/CRISP.Generate\\_Ticket](http://commons.cit.nih.gov/crisp3/CRISP.Generate_Ticket)

- **Project Title: Fluconazole Resistance in Oropharyngeal Candidiasis**

Principal Investigator & Institution: Patterson, Thomas F.; Professor of Medicine; Medicine; University of Texas Hlth Sci Ctr San Ant 7703 Floyd Curl Dr San Antonio, Tx 78229

Timing: Fiscal Year 2000; Project Start 0-SEP-1994; Project End 8-FEB-2002

Summary: (Adapted from Applicant's Abstract) Fluconazole resistance has become an important problem in the management of HIV-infected patients with recurrent oropharyngeal candidiasis (OPC). Fluconazole resistance can develop in a persistent strain or from emergence of a new resistant strain. Cross-resistance to other antifungals is common. Molecular mechanisms of fluconazole resistance include alterations in the target enzyme, increased efflux of drug mediated by two types of multidrug pumps, and changes in plasma membrane sterols. The prevalence of these mechanisms and the correlation between mechanisms of resistance and antifungal management strategies has not been

determined. The use of highly active retroviral therapy has reduced the incidence of oropharyngeal candidiasis in some patients, but the impact of antiretroviral therapy on recurrence of infection and specific mechanisms of resistance is not known. Thus, the objectives of this proposal are to investigate the molecular epidemiology of antifungal resistance in oropharyngeal candidiasis and to correlate efficacy of antifungal therapy with mechanisms of resistance. These objectives will be achieved through the unique opportunity to analyze mechanisms of resistance in a collection of over 4,500 yeast isolates collected prospectively from over 291 episodes of thrush in 64 patients serially evaluated. The specific aims of this proposal are: 1) to evaluate the impact of highly active antiretroviral therapy on oropharyngeal candidiasis and to determine the efficacy of high dose fluconazole in oropharyngeal candidiasis due to yeasts with decreased susceptibility in order to establish the effect of therapeutic strategies on development of resistance; 2) to determine the epidemiology of molecular mechanisms of resistance in oropharyngeal candidiasis and to assess the correlation between resistance mechanisms and antifungal management strategies and response to treatment; and 3) to characterize molecular resistance mechanisms in selected clinical isolate without known resistance mechanisms, assess the correlation between treatment strategies and resistance mechanisms, and ultimately result in improved management of patients with oropharyngeal candidiasis.

Website: [http://commons.cit.nih.gov/crisp3/CRISP.Generate\\_Ticket](http://commons.cit.nih.gov/crisp3/CRISP.Generate_Ticket)

- **Project Title: Pathogenesis of Oropharyngeal Candidiasis**

Principal Investigator & Institution: Filler, Scott G.; Associate Professor; Harbor-Ucla Research & Educ Inst at Harbor-Ucla Medical Center Torrance, Ca 90502

Timing: Fiscal Year 2000; Project Start 9-SEP-2000; Project End 1-JUL-2005

Summary: (abstract verbatim) *Candida albicans* is an opportunistic pathogen that causes an oropharyngeal infection in a large and diverse population of patients. The overall goal of this project is to utilize highly innovative molecular biology strategies to identify as yet undiscovered virulence factors of *C. albicans* that will be attractive vaccine targets. The driving forces behind this effort are the high prevalence of oropharyngeal candidiasis worldwide, the attractiveness of a vaccine strategy, and the need for treatment approaches that will minimize antifungal resistance. The ability to filament is critical for *C. albicans* to cause an oropharyngeal infection. However, there is a paucity of knowledge as to which of the signal transduction pathways that regulate filamentation enable *C. albicans* to cause an oropharyngeal infection. Moreover, there is little

information about which virulence factors are regulated by these various pathways. Our central hypotheses are that specific filamentation regulatory pathways that are active in *C. albicans* when it causes an oropharyngeal infection control the expression of other virulence factors. These virulence factors enable the organism to adhere to, invade and injure host cells during the development of oropharyngeal candidiasis. In addition, the filamentation regulatory pathways control the expression of antigens on the surface of *C. albicans*, which alter the host inflammatory response that is elicited by the organism. In this project, the applicants will assess the ability of null mutants of *C. albicans* containing defined defects in the filamentation regulatory pathways to adhere to, invade, injure and stimulate oral epithelial cells in vitro. Based on this assessment, they will select mutants that are highly likely to have reduced virulence. They then determine their ability to cause an oropharyngeal infection in the hyposalivatory rat model. Next, they will construct and use a *C. albicans* DNA microarray to identify genes encoding potential virulence factors that are expressed by the wild-type strain, but not the mutants with reduced virulence. They will determine the contribution of these candidate genes to virulence by constructing of these second generation mutants with oral epithelial cells in vitro and their virulence in the rat model of oropharyngeal infection.

Website: [http://commons.cit.nih.gov/crisp3/CRISP.Generate\\_Ticket](http://commons.cit.nih.gov/crisp3/CRISP.Generate_Ticket)

- **Project Title: ACTG 323--Fluconazole as Chronic Supp. Therapy Vs. Episodic Therapy in HIV+ PTS**

Principal Investigator & Institution: Sacks, Henry S.; ; Mount Sinai School of Medicine of Cuny New York, Ny 10029

Timing: Fiscal Year 2000

Summary: The primary objective of this multicenter, randomized, open-label study is to compare the effects of management strategies using episodic fluconazole therapy versus continuous fluconazole prophylaxis for oropharyngeal candidiasis on the time to development of clinically significant fluconazole-refractory infections.

Website: [http://commons.cit.nih.gov/crisp3/CRISP.Generate\\_Ticket](http://commons.cit.nih.gov/crisp3/CRISP.Generate_Ticket)

- **Project Title: ACTG 323--Fluconazole as Chronic Suppressive Therapy Vs Episodic Therapy**

Principal Investigator & Institution: Macgregor, Rob R.; ; University of Pennsylvania 3451 Walnut Philadelphia, Pa 19104

Timing: Fiscal Year 2000

Summary: To compare 2 long-term management strategies (chronic suppressive vs. episodic therapy) for oropharyngeal candidiasis using Fluconazole.

Website: [http://commons.cit.nih.gov/crisp3/CRISP.Generate\\_Ticket](http://commons.cit.nih.gov/crisp3/CRISP.Generate_Ticket)

- **Project Title: C Albicans Regulation Beta-Defensins in Oral Epithelia**

Principal Investigator & Institution: Weinberg, Aaron; Associate Professor; Periodontics; Case Western Reserve University 10900 Euclid Ave Cleveland, Oh 44106

Timing: Fiscal Year 2000; Project Start 8-SEP-2000; Project End 1-JUL-2003

Summary: (adapted from the applicant's abstract) Oropharyngeal candidiasis (OPC) is an emerging disorder owing to the prevalence of AIDS, misuse of antibiotics, and host immunosuppression in general. *Candida albicans* is the most common fungal species isolated from OPC lesions. Recent findings show that mucosal epithelial cells synthesize and secrete antibacterial and antifungal agents, belonging to a family of small, cationic peptides. These molecules, human beta-defensins 1 and 2 (hBD-1, hBD-2) are predicted to function as a first line of host defense against microbial pathogenesis. The PI has discovered that these peptides are expressed in normal human gingival epithelial cells and associated with differentiated epithelium of oral tissues. Moreover, they found that the non oral, yet disseminating isolate *C. albicans* strain SC5314 stimulates beta-defensin expression in oral epithelial cells, but a clinical OPC isolate does not. This proposal intends to test hypotheses relevant to oropharyngeal candidiasis emanating from the postulate that oral epithelial cells can be stimulated to produce beta-defensins that protect the host from candidal challenges at the oral mucosal barrier. The objectives of this proposal are (1) to determine beta-defensin expression in oral epithelial cells in response to challenge with OPC derived *C. albicans* isolates, (2) to characterize key virulence factors of *C. albicans* SC5314 and OPC isolates that lead to beta-defensin response, (3) to examine beta-defensin protection against *C. albicans*, and (4) to identify genes in oral epithelial cells associated with *C. albicans* modulation of beta-defensin expression, using microarray technology. The PI hypothesizes that peptide-based antimicrobial defense may be a way in which the gingival epithelium resists invasion of potential pathogens. In light of the frequent adjunctive use of antibiotics and antimycotics in treating oral diseases, with the threat of microbial resistance, investigations into novel eukaryotic peptides, such as beta-defensins, are highly significant and offer the potential for future clinical promise. The PI states that this research direction may be significant in leading to

future studies with potential application to oral disorders, therapeutic use, and technology development.

Website: [http://commons.cit.nih.gov/crisp3/CRISP.Generate\\_Ticket](http://commons.cit.nih.gov/crisp3/CRISP.Generate_Ticket)

- **Project Title: C. Albicans Regulatory Pathways in Oral Candidiasis**

Principal Investigator & Institution: Mitchell, Aaron P.; Professor; Institute of Cancer Research; Columbia University Health Sciences Ogc New York, Ny 10032

Timing: Fiscal Year 2001; Project Start 1-JUN-2001; Project End 0-APR-2006

Summary: *Candida albicans* is an opportunistic fungal pathogen that is the major cause of oropharyngeal candidiasis (OPC). This disease causes significant morbidity among AIDS patients, even since the advent of highly active antiretroviral therapy. OPC is treated primarily with azole antifungals, but the continuing problem of azole resistance has created a need for new antifungal strategies. Our goal is to identify new *C. albicans* virulence genes, which will hold promise as targets for these strategies. The ability of *C. albicans* to produce filamentous cells is associated with pathogenicity, and several *C. albicans* filamentation regulators have been found through approaches based on filamentation of *Saccharomyces cerevisiae* (baker's yeast). Filamentation is well defined in *S. cerevisiae* because of its facile genetic system, but the *S. cerevisiae* model is limited because it is seldom a pathogen, because it fails to produce true hyphae, and because it fails to respond to several inducers of filamentation for *C. albicans*. In fact, the major filamentation regulators defined with the *S. cerevisiae* model, Efg1p and Cph1p, are not essential for infection in a piglet OPC model. Our hypothesis is that there are *C. albicans*-specific filamentation regulatory genes that will be critical for pathogenicity in OPC, and our immediate objective is to find those genes. We will isolate homozygous random insertion mutations in *C. albicans*, identify those genes that alter filamentation control, and test defined mutants for pathogenicity in a murine OPC model.

Website: [http://commons.cit.nih.gov/crisp3/CRISP.Generate\\_Ticket](http://commons.cit.nih.gov/crisp3/CRISP.Generate_Ticket)

- **Project Title: CS96 209 SCH56592 versus Fluconazole in the Treatment of Oropharyngeal Candida**

Principal Investigator & Institution: Wheat, Joseph; ; Indiana Univ-Purdue Univ at Indianapolis 355 N Lansing Indianapolis, in 46202

Timing: Fiscal Year 2000

Summary: This study will be carried out to assess safety, tolerability, and efficacy parameters in HIV-positive patients with oropharyngeal

candidiasis (OPC), and also to select a dose or doses prior to initiation of studies in patients with systemic fungal infections. The primary objective: Demonstration of the clinical efficacy of the highest dose of SCH 56592.

Website: [http://commons.cit.nih.gov/crisp3/CRISP.Generate\\_Ticket](http://commons.cit.nih.gov/crisp3/CRISP.Generate_Ticket)

- **Project Title: Fluconazole in HIV+ Subjects with Recurrent Oropharyngeal Candidiasis**

Principal Investigator & Institution: Valentine, Fred; ; New York University School of Medicine 550 1St Ave New York, Ny 10016

Timing: Fiscal Year 2000

Summary: This is a randomized Phase IV study to evaluate the use of fluconazole as chronic suppressive versus episodic therapy in HIV positive subjects with recurrent oropharyngeal candidiasis. Subjects must have a CD4 count of less than or equal to 150 cells/mm<sup>3</sup> and have had at least one episode of thrush within the last 6 months.

Website: [http://commons.cit.nih.gov/crisp3/CRISP.Generate\\_Ticket](http://commons.cit.nih.gov/crisp3/CRISP.Generate_Ticket)

- **Project Title: Histatin Receptors as Drug Targets for Oral Candidiasis**

Principal Investigator & Institution: Edgerton, Mira; Research Associate Professor; Oral Biology; State University of New York at Buffalo Capen Hall Buffalo, Ny 14260

Timing: Fiscal Year 2000; Project Start 1-MAR-1999; Project End 9-FEB-2004

Summary: This is a new application for an Independent Scientist Award (K02) for Dr. Mira Edgerton, and it accompanies the already funded R01DE12159 grant. Dr. Edgerton has a D.D.S. degree, specialty training in prosthodontics, and a Ph.D. in Oral Biology. She is an Assistant Professor in the Departments of Restorative Dentistry and Oral Biology at the State University of New York at Buffalo (SUNYAB). Dr. Edgerton's research has focused on characterizing the structural elements of salivary histatins required for candidacidal activity as well as the cellular mechanism of action of histatins with *Candida albicans*. Her work has identified a *C. albicans* membrane protein (HstBP) which is a yeast receptor protein of the histatin candidacidal pathway. The current research project will clone and sequence the *C. albicans* HstBP gene and examine its expression as a virulence or resistance factor in yeast from HIV-oropharyngeal candidiasis patients. Dr. Edgerton's immediate goals are to use the most current techniques in yeast molecular genetic to identify mechanisms of *C. albicans* pathogenicity in the oral cavity. Her long range goals are to define the molecular basis of virulence, pathogenesis and drug resistance of *C. albicans* in order to develop better treatment modalities for local

and systemic candidiasis. Achievement of these goals is possible only through acquisition of an in-depth background in yeast molecular genetics and knowledge of the most current systems for eukaryotic genetics. Dr. Edgerton's scientific career would be advanced through this additional training and experience. The research environment in the Department of Oral Biology at SUNYAB in combination with experiences in the laboratories of other yeast molecular geneticists is excellent for development of the research career of Dr. Edgerton. However, her clinical teaching duties limit the time available to her for acquiring these additional research skills. This ISA application is to obtain salary support to release Dr. Edgerton from her clinical teaching and committee responsibilities in order to devote 80% of her full time professional effort to research activities. This award would provide her the opportunity to extend her background in yeast biology to the molecular level and apply this new expertise to studies of virulence and pathogenesis of oral and systemic candidiasis.

Website: [http://commons.cit.nih.gov/crisp3/CRISP.Generate\\_Ticket](http://commons.cit.nih.gov/crisp3/CRISP.Generate_Ticket)

- **Project Title: Identifying Candida Gene in Thrush Using Iviat**

Principal Investigator & Institution: Nguyen, Minh-Hong T.; Medicine; University of Florida Gainesville, FL 32611

Timing: Fiscal Year 2000; Project Start 9-SEP-2000; Project End 1-JUL-2004

Summary: (abstract verbatim) The applicants have used a novel in vivo microbial expression technology called In Vivo Induced Antigen Technology (IVIAT) to study the pathogenesis of oropharyngeal candidiasis (OPC) in HIV-infected patients. IVIAT uses anti-Candida albicans antibodies in the sera of HIV-infected patients to identify antigens that are expressed in vivo by C. albicans but are not expressed during routine in vitro growth. In preliminary studies, they have confirmed that IVIAT can identify virulence factors for C. albicans. In this proposal, they propose to modify IVIAT to identify antigens expressed by C. albicans during OPC but not expressed during either colonization of the oral mucosa by C. albicans or during in vitro growth. They hypothesize that some of the antigens expressed by C. albicans exclusively during OPC are important virulence factors, and identifying these antigens will provide insight into the mechanisms by which C. albicans is transformed from a harmless commensal organism into an invasive pathogen. This application has five specific aims. In the first specific aim, two separate pooled batches of sera, one from HIV-infected patients with OPC and the other from HIV-infected patients with colonization, will be exhaustively adsorbed with in vitro grown clinical C. albicans isolates to remove all antibodies that react with antigens

expressed in vitro. The adsorbed sera will be used for differential screening of a *C. albicans* genomic expression library. In specific aim 2, the plasmid DNA will be purified from clones that are reactive with the OPC sera but not with the colonization sera and the open reading frames (ORFs) responsible for the serum reactivity will be determined. In specific aim 3, they will confirm that the IVIAT antigens are not expressed by *C. albicans* in vitro. In specific aim 4, they will clone *C. albicans* genes encoding IVIAT antigens and purify the proteins expressed by these genes. Lastly, in specific aim 5, they will confirm that the IVIAT antigens are present within thrush samples recovered from HIV-infected patients by light microscopic immunohistochemistry using antibody raised against the purified proteins. They hope that this study will identify new *C. albicans* virulence factors, increase our understanding of the humoral response to OPC, and lead to potential applications for drug, vaccine or diagnostic test development. With the experience from this project, IVIAT should be readily adaptable to study other candidal infections and other fungal pathogens. Potential advantages of IVIAT over existing technologies include the use of the human immune response to identify in vivo expressed genes rather than animal models, its relative technical simplicity, and its ability to study differential gene expression in different types of *C. albicans* infections in humans.

Website: [http://commons.cit.nih.gov/crisp3/CRISP.Generate\\_Ticket](http://commons.cit.nih.gov/crisp3/CRISP.Generate_Ticket)

- **Project Title: Oral Immune Dysfunction and Candidiasis in HIV Infection**

Principal Investigator & Institution: Fidel, Paul L.; Professor; Microbiol/Immunology/Parasitology; Louisiana State Univ Hsc New Orleans Health Sciences Ctr New Orleans New Orleans, La 70112

Timing: Fiscal Year 2000; Project Start 1-APR-1998; Project End 1-MAR-2002

Summary: (Adapted from applicant's abstract) Protective T cell-mediated (CMI) mechanisms at the oral mucosa are poorly understood. Oropharyngeal candidiasis (OPC) is the most common oral manifestation of HIV infection and first clinical sign of immunosuppression during progression to AIDS. It is unclear, however, what immunological events take place in the oral mucosa to promote the conversion of *Candida albicans* from commensal to pathogen and ultimately to the development of OPC. Clinical and laboratory investigations suggest that CMI (T cells, cytokines) is the predominant host defense mechanism against *C. albicans* at mucosal surfaces. The preliminary data of the PI together with clinical observations indicate

that while both systemic and local immunity is important, they may function with some level of independence. The PI hypothesizes that individuals suffering from advanced HIV infection acquire OPC and other oral diseases as a result of specific changes/dysfunction(s) in the normal protective CMI at the oral mucosa that may or may not correlate with systemic CMI. To test this hypothesis, he will focus on individuals with OPC in an urban patient cohort of HIV+ individuals with considerable age, gender, and racial diversity in the HIV Outpatient Program (HOP) at LSU Medical Center and perform a cross-sectional, case-controlled study with three Specific Aims. The applicant will 1) characterize the oral CD4+/CD8+ lymphocyte profile in HIV+ individuals with and without OPC and in HIV- individuals through the molecular and immunological analysis of oral biopsy tissue; 2) characterize the orally secreted Th-related immune molecules (ie., cytokines, antibodies) in each patient group through the analysis of saliva and biopsy samples; and 3) correlate the mucosal immune profile with quantitative and qualitative measurements of viral load determined by PCR of two HIV-associated viral genes (gag and pro) in the oral cavity. Data gathered relative to the oral cavity will be correlated to levels in the systemic compartment (blood, plasma and in the supernatants of blood lymphocytes stimulated in vitro with *Candida* antigens). The long-term goals of this project are to better understand CMI in the oral mucosa, to define immunological events/conditions associated with the susceptibility of HIV+ individuals to OPC, and to develop immunological based strategies to enhance resistance/protection against oral pathogens during HIV infection.

Website: [http://commons.cit.nih.gov/crisp3/CRISP.Generate\\_Ticket](http://commons.cit.nih.gov/crisp3/CRISP.Generate_Ticket)

- **Project Title: Phase IV Randomized Study of Fluconazole as Chronic Suppressive Therapy**

Principal Investigator & Institution: Goldman, Mitchell; ; Indiana Univ-Purdue Univ at Indianapolis 355 N Lansing Indianapolis, in 46202

Timing: Fiscal Year 2000

Summary: This study is a multicenter, prospective, phase IV, randomized, open-label study of the use of fluconazole comparing two long-term management strategies for oropharyngeal candidiasis. 948 HIV-infected persons with a CD4 count of < 150 cells/mm<sup>3</sup> and at least one prior episode of oropharyngeal candidiasis (OPC) within 6 months prior to study entry will be randomized. The primary study objective is to compare the effects of management strategies using episodic fluconazole therapy versus continuous fluconazole prophylaxis for

oropharyngeal candidiasis on the time to development of clinically significant fluconazole-refractory infections.

Website: [http://commons.cit.nih.gov/crisp3/CRISP.Generate\\_Ticket](http://commons.cit.nih.gov/crisp3/CRISP.Generate_Ticket)

- **Project Title: Toll-like Receptors in Candidiasis**

Principal Investigator & Institution: Hong, Soon-Cheol; Microbiology and Immunology; Medical College of Ohio at Toledo Box 10008 Toledo, Oh 43699

Timing: Fiscal Year 2000; Project Start 9-SEP-2000; Project End 0-JUN-2001

Summary: (abstract verbatim) Oropharyngeal candidiasis (OPC) is a major problem in patients with AIDS, diabetes, and a number of other predisposing conditions. The predominant species, *Candida albicans*, may be found in small numbers in healthy persons but the numbers increase dramatically when OPC is found. The nature of host resistance to *Candida* is poorly understood in that it is not at all clear why the numbers of yeast remain low in healthy persons. The PI proposes that the interactions of *C. albicans* with toll-like receptors play a role in the induction of protective defenses. In our preliminary experiments, the PI has found that *C. albicans* mannan, as well as lipopolysaccharide from Gram-negative bacteria, regulates several different TLRs in murine macrophages. The PI plans to analyze the kinetics of TLR gene expression after macrophage exposure to mannan. In addition to assaying mRNA, production of TLR proteins will be monitored by use of antibodies generated as part of the research. In addition, they will investigate the role of mannan as a regulator of expression of the co-stimulatory molecules B7-1 and B7-2, and of the proinflammatory cytokine TNF- $\alpha$  as these can be induced as a result of TLR-mediated signaling. They will determine whether whole cells and a variety of extracts of *C. albicans* and other yeast species invoke the same sort of immune response via interactions involving TLRs. Successful understanding of the interactions of pathogenic yeasts with TLRs should lay a foundation for development of immunological strategies that may augment defense responses in OPC and other infectious diseases.

Website: [http://commons.cit.nih.gov/crisp3/CRISP.Generate\\_Ticket](http://commons.cit.nih.gov/crisp3/CRISP.Generate_Ticket)

## E-Journals: PubMed Central<sup>20</sup>

PubMed Central (PMC) is a digital archive of life sciences journal literature developed and managed by the National Center for Biotechnology Information (NCBI) at the U.S. National Library of Medicine (NLM).<sup>21</sup> Access to this growing archive of e-journals is free and unrestricted.<sup>22</sup> To search, go to <http://www.pubmedcentral.nih.gov/index.html#search>, and type “oropharyngeal candidiasis” (or synonyms) into the search box. This search gives you access to full-text articles. The following is a sample of items found for oropharyngeal candidiasis in the PubMed Central database:

- **Transmission of an Azole-Resistant Isogenic Strain of *Candida albicans* among Human Immunodeficiency Virus-Infected Family Members with Oropharyngeal Candidiasis** by Frank-Michael C. Muller, Miki Kasai, Andrea Francesconi, Beth Brillante, Maureen Roden, Joanne Peter, Stephen J. Chanock, and Thomas J. Walsh; 1999 October  
<http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=85585&rendertype=external>

## 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.<sup>23</sup> 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

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<sup>20</sup> Adapted from the National Library of Medicine:

<http://www.pubmedcentral.nih.gov/about/intro.html>.

<sup>21</sup> With PubMed Central, NCBI is taking the lead in preservation and maintenance of open access to electronic literature, just as NLM has done for decades with printed biomedical literature. PubMed Central aims to become a world-class library of the digital age.

<sup>22</sup> The value of PubMed Central, in addition to its role as an archive, lies the availability of data from diverse sources stored in a common format in a single repository. Many journals already have online publishing operations, and there is a growing tendency to publish material online only, to the exclusion of print.

<sup>23</sup> 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.

some other type of fee may be required to access the full text of articles in some journals.

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

## Vocabulary Builder

**Antibiotics:** Substances produced by microorganisms that can inhibit or suppress the growth of other microorganisms. [NIH]

**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 mode of action as agglutinins, bacteriolysins, haemolysins, opsonins, precipitins, etc. [EU]

**Antigens:** Substances that are recognized by the immune system and induce an immune reaction. [NIH]

**Antimycotic:** Suppressing the growth of fungi. [EU]

**Benign:** Not malignant; not recurrent; favourable for recovery. [EU]

**Biopsy:** The removal and examination, usually microscopic, of tissue from the living body, performed to establish precise diagnosis. [EU]

**Cheilitis:** Inflammation of the lips. It is of various etiologies and degrees of pathology. [NIH]

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

**Commensal:** 1. living on or within another organism, and deriving benefit without injuring or benefiting the other individual. 2. an organism living on or within another, but not causing injury to the host. [EU]

**Cytokines:** Non-antibody proteins secreted by inflammatory leukocytes and some non-leukocytic cells, that act as intercellular mediators. They differ from classical hormones in that they are produced by a number of tissue or cell types rather than by specialized glands. They generally act locally in a paracrine or autocrine rather than endocrine manner. [NIH]

**Defensins:** Family of antimicrobial peptides that have been identified in humans, animals, and plants. They are thought to play a role in host

defenses against infections, inflammation, wound repair, and acquired immunity. Based on the disulfide pairing of their characteristic six cysteine residues, they are divided into alpha-defensins and beta-defensins. [NIH]

**Dentition:** The teeth in the dental arch; ordinarily used to designate the natural teeth in position in their alveoli. [EU]

**Dentures:** An appliance used as an artificial or prosthetic replacement for missing teeth and adjacent tissues. It does not include crowns, dental abutments, nor tooth, artificial. [NIH]

**Enzyme:** A protein molecule that catalyses chemical reactions of other substances without itself being destroyed or altered upon completion of the reactions. Enzymes are classified according to the recommendations of the Nomenclature Committee of the International Union of Biochemistry. Each enzyme is assigned a recommended name and an Enzyme Commission (EC) number. They are divided into six main groups; oxidoreductases, transferases, hydrolases, lyases, isomerases, and ligases. [EU]

**Epithelium:** The covering of internal and external surfaces of the body, including the lining of vessels and other small cavities. It consists of cells joined by small amounts of cementing substances. Epithelium is classified into types on the basis of the number of layers deep and the shape of the superficial cells. [EU]

**Humoral:** Of, relating to, proceeding from, or involving a bodily humour - now often used of endocrine factors as opposed to neural or somatic. [EU]

**Immunity:** The condition of being immune; the protection against infectious disease conferred either by the immune response generated by immunization or previous infection or by other nonimmunologic factors (innate i.). [EU]

**Immunohistochemistry:** Histochemical localization of immunoreactive substances using labeled antibodies as reagents. [NIH]

**Ketoconazole:** Broad spectrum antifungal agent used for long periods at high doses, especially in immunosuppressed patients. [NIH]

**Kinetic:** Pertaining to or producing motion. [EU]

**Lesion:** Any pathological or traumatic discontinuity of tissue or loss of function of a part. [EU]

**Periodontics:** A dental specialty concerned with the histology, physiology, and pathology of the tissues that support, attach, and surround the teeth, and of the treatment and prevention of disease affecting these tissues. [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]

**Prosthodontics:** A dental specialty concerned with the restoration and maintenance of oral function by the replacement of missing teeth and structures by artificial devices or prostheses. [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]

**Radiology:** A specialty concerned with the use of x-ray and other forms of radiant energy in the diagnosis and treatment of disease. [NIH]

**Receptor:** 1. a molecular structure within a cell or on the surface characterized by (1) selective binding of a specific substance and (2) a specific physiologic effect that accompanies the binding, e.g., cell-surface receptors for peptide hormones, neurotransmitters, antigens, complement fragments, and immunoglobulins and cytoplasmic receptors for steroid hormones. 2. a sensory nerve terminal that responds to stimuli of various kinds. [EU]

**Recurrence:** The return of a sign, symptom, or disease after a remission. [NIH]

**Saccharomyces:** A genus of ascomycetous fungi of the family Saccharomycetaceae, order saccharomycetales. [NIH]

**Serum:** The clear portion of any body fluid; the clear fluid moistening serous membranes. 2. blood serum; the clear liquid that separates from blood on clotting. 3. immune serum; blood serum from an immunized animal used for passive immunization; an antiserum; antitoxin, or antivenin. [EU]

**Vaccine:** A suspension of attenuated or killed microorganisms (bacteria, viruses, or rickettsiae), administered for the prevention, amelioration or treatment of infectious diseases. [EU]

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

**Virulence:** The degree of pathogenicity within a group or species of microorganisms or viruses as indicated by case fatality rates and/or the ability of the organism to invade the tissues of the host. [NIH]

**Yeasts:** A general term for single-celled rounded fungi that reproduce by budding. Brewers' and bakers' yeasts are *saccharomyces cerevisiae*; therapeutic dried yeast is yeast, dried. [NIH]

## CHAPTER 5. BOOKS ON OROPHARYNGEAL CANDIDIASIS

### Overview

This chapter provides bibliographic book references relating to oropharyngeal candidiasis. You have many options to locate books on oropharyngeal candidiasis. 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](http://www.amazon.com) and [www.bn.com](http://www.bn.com)). In addition to online booksellers, excellent sources for book titles on oropharyngeal candidiasis 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 "oropharyngeal candidiasis" (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:<sup>24</sup>

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<sup>24</sup> 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

- **Allergies and candida: with the physicist's rapid solution.** Author: by Steven Rochlitz; foreword by John Wright; artwork by Ken Vatter; Year: 9999; New York: Human Ecology Balancing Sciences, c1991-; ISBN: 0945262205 (v. 1)  
<http://www.amazon.com/exec/obidos/ASIN/0945262205/icongroupinterna>
- **Candida albicans: the pathogenic fungus.** Author: Cora G. Saltarelli; Year: 1989; New York: Hemisphere Pub. Corp., c1989; ISBN: 0891168974  
<http://www.amazon.com/exec/obidos/ASIN/0891168974/icongroupinterna>
- **Candida and candidiasis.** Author: edited by Richard A. Calderone; Year: 2002; Washington, D.C.: ASM Press, c2002; ISBN: 1555812120  
<http://www.amazon.com/exec/obidos/ASIN/1555812120/icongroupinterna>
- **Candida and candidosis.** Author: F.C. Odds; Year: 1988; London; Philadelphia: Baillière Tindall, 1988; ISBN: 0702012653  
<http://www.amazon.com/exec/obidos/ASIN/0702012653/icongroupinterna>
- **Candida, silver (mercury) fillings, and the immune system.** Author: Betsy Russell-Manning, editor; Year: 1990; San Francisco, Calif.: Greensward Press, 1990; ISBN: 0930165101  
<http://www.amazon.com/exec/obidos/ASIN/0930165101/icongroupinterna>
- **Candidiasis: pathogenesis, diagnosis, and treatment.** Author: editor, Gerald P. Bodey; Year: 1993; New York: Raven Press, c1993; ISBN: 0881679542  
<http://www.amazon.com/exec/obidos/ASIN/0881679542/icongroupinterna>
- **Carcinoma of the oral cavity and oropharynx.** Author: H.-D. Pape, U. Danzer, G. Schmitt, (eds.); Year: 1994; Berlin; New York: Springer-Verlag, c1994; ISBN: 3540568190 (alk. paper)  
<http://www.amazon.com/exec/obidos/ASIN/3540568190/icongroupinterna>
- **Clinical perspectives: terconazole, an advance in vulvovaginal candidiasis therapy: proceedings from a symposium, Laguna Niguel,**

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links to PubMed abstracts. Each PubMed abstract has a "Books" button that displays a 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>.

- California, October 15-16, 1987.** Author: editor, Jack D. Sobel; Year: 1988; New York, NY: BMI/McGraw-Hill, c1988
- **Oral candidosis.** Author: edited by Lakshman P. Sawaranayake, T. Wallace MacFarlane; with a foreword by Jens J. Pindborg; Year: 1990; London; Boston: Wright, 1990; ISBN: 0723609837  
<http://www.amazon.com/exec/obidos/ASIN/0723609837/icongroupinterna>
  - **Oral candidosis.** Author: M.V. Martin, W.R. Tyldesley; Year: 1986; Hounslow, Middlesex: E.R. Squibb, c1986; ISBN: 0948900008
  - **Treatment of fungal and candidal infections.** Author: editor, Boni Elewski; Year: 1997; Copenhagen: Munksgaard, c1997

## Chapters on Oropharyngeal Candidiasis

Frequently, oropharyngeal candidiasis will be discussed within a book, perhaps within a specific chapter. In order to find chapters that are specifically dealing with oropharyngeal candidiasis, an excellent source of abstracts is the Combined Health Information Database. You will need to limit your search to book chapters and oropharyngeal candidiasis 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 "oropharyngeal candidiasis" (or synonyms) into the "For these words:" box, you will only receive results on chapters in books. The following is a typical result when searching for book chapters on oropharyngeal candidiasis:

- **Candidiasis/Candidosis**

Source: in Bottomley, W.K. and Rosenberg, S.W., eds. *Clinician's Guide to Treatment of Common Oral Conditions*. 4th ed. Baltimore, MD: American Academy of Oral Medicine (AAOM). 1997. p. 5-6.

Contact: Available from American Academy of Oral Medicine (AAOM). 2910 Lightfoot Drive, Baltimore, MD 21209-1452. (410) 602-8585. Website: [www.aaom.com](http://www.aaom.com). PRICE: \$21.00 plus shipping and handling.

Summary: This chapter is from a quick reference guide to the management of some common oral conditions. This brief chapter discusses candida albicans, a yeastlike fungus that tends to proliferate with the use of antibiotics, corticosteroids, medicines that reduce salivary output, and cytotoxic agents. The authors provide a summary of

the etiology, clinical description, and rationale for treatment, then outline recommended topical antifungal agents used to treat the condition.

- **Thrush (Oral Candidiasis)**

Source: in Griffith, H.W. *Instruction for Patients*. 5th ed. Orlando, FL: W.B. Saunders Company. 1994. p. 462.

Contact: Available from W.B. Saunders Company. Order Fulfillment, 6277 Sea Harbor Drive, Orlando, FL 32887-4430. (800) 545-2522 (individuals) or (800) 782-4479 (schools); Fax (800) 874-6418 or (407) 352-3445; <http://www.wbsaunders.com>. PRICE: \$52.00 (English); \$49.95 (Spanish); plus shipping and handling. ISBN: 0721649300 (English); 0721669972 (Spanish).

Summary: This fact sheet on oral candidiasis (thrush) is from a compilation of instructions for patients, published in book format. The fact sheet provides information in three sections: basic information, including a description of the condition, frequent signs and symptoms, causes, risk factors, preventive measures, expected outcome, and possible complications; treatment, including general measures, medication, activity guidelines, and diet; and when to contact one's health care provider. The fact sheet is designed to be photocopied and distributed to patients as a reinforcement of oral instructions and as a teaching tool.

- **Oral Thrush**

Source: in World Health Organization (WHO) *Global Programme on AIDS. Guidelines for the Clinical Management of HIV Infection in Adults*. Geneva, Switzerland: World Health Organization. 1991. p. 4:1-4:10.

Contact: Available from WHO Publications Center USA. 49 Sheridan Avenue, Albany, NY 12210. Fax (518) 436-7433. E-mail: [publications@who.ch](mailto:publications@who.ch). PRICE: \$11.70 plus shipping and handling.

Summary: This chapter provides a patient care algorithm for managing patients with HIV-infection who have oral thrush. The chapter is from a set of guidelines, published by the World Health Organization, on the clinical management of HIV infection in adults. The guidelines address the wide variations in the presentation of HIV-related diseases, availability of resources, and health infrastructures in various countries around the world. The algorithm for oral thrush begins with instructions for diagnosis, the describes recommended treatment options, including treatment for chronic or recurrent thrush problems. The author notes that candidiasis may extend into the esophagus and cause difficulty (dysphagia) and pain (odynophagia) on swallowing. Hairy leukoplakia

may mimic thrush. Therapies discussed include ketoconazole, clotrimazole, miconazole, and amphotericin B. In the presence of oral candidiasis, gastroscopy is usually only performed after failure of adequate antifungal chemotherapy and in the presence of esophageal symptoms. A biopsy is important to confirm tissue invasion by *Candida albicans* or to identify other causes. 1 figure. (AA-M).

## General Home References

In addition to references for oropharyngeal candidiasis, 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):

- **The Bacteria Menace: Today's Emerging Infections and How to Protect Yourself** by Skye Weintraub; Paperback - 350 pages (May 2002), Woodland Publishing; ISBN: 1580543529;  
<http://www.amazon.com/exec/obidos/ASIN/1580543529/icongroupinterna>
- **Bacterial Infections** by Axel Dalhoff (Editor); Paperback (April 1999), S. Karger Publishing; ISBN: 380556841X;  
<http://www.amazon.com/exec/obidos/ASIN/380556841X/icongroupinterna>
- **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>
- **I Know How We Fight Germs (Sam's Science)** by Kate Rowan, et al; School & Library Binding - 32 pages (January 1999), Candlewick Press; ISBN: 0763605034;  
<http://www.amazon.com/exec/obidos/ASIN/0763605034/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>

## Vocabulary Builder

**Contraceptive:** An agent that diminishes the likelihood of or prevents conception. [EU]

**Cytotoxic:** Pertaining to or exhibiting cytotoxicity. [EU]

**Dysphagia:** Difficulty in swallowing. [EU]

**Fatigue:** The state of weariness following a period of exertion, mental or physical, characterized by a decreased capacity for work and reduced efficiency to respond to stimuli. [NIH]

**Gastroscopy:** Endoscopic examination, therapy or surgery of the interior of the stomach. [NIH]

**Herpes:** Any inflammatory skin disease caused by a herpesvirus and characterized by the formation of clusters of small vesicles. When used alone, the term may refer to herpes simplex or to herpes zoster. [EU]

**Oropharynx:** Oral part of the pharynx. [NIH]

**Otolaryngology:** A surgical specialty concerned with the study and treatment of disorders of the ear, nose, and throat. [NIH]

**Pediculosis:** Infestation with lice of the family Pediculidae, especially infestation with *Pediculus humanus*. [EU]

**Scabies:** A contagious dermatitis of humans and various wild and domestic animals caused by the itch mite, *Sarcoptes scabiei*, transmitted by close contact, and characterized by a papular eruption over tiny, raised sinuous burrows (cuniculi) produced by digging into the upper layer of the epidermis by the egg-laying female mite, which is accompanied by intense pruritus and sometimes associated with eczema from scratching and secondary bacterial infection. Called also the itch and seven-year itch. [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.<sup>25</sup> 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:<sup>26</sup>

- **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](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](http://www.nlm.nih.gov/databases/databases_population.html)

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<sup>25</sup> Remember, for the general public, the National Library of Medicine recommends the databases referenced in MEDLINEplus (<http://medlineplus.gov/> or <http://www.nlm.nih.gov/medlineplus/databases.html>).

<sup>26</sup> See <http://www.nlm.nih.gov/databases/databases.html>.

- **Cancer Information:** Access to cancer-oriented databases:  
[http://www.nlm.nih.gov/databases/databases\\_cancer.html](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](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](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](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](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 oropharyngeal candidiasis, 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 oropharyngeal candidiasis 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 “oropharyngeal candidiasis” (or synonyms) into the “For these words:” box above, you will only receive results on fact sheets dealing with oropharyngeal candidiasis. The following is a sample result:

- **What Patients With HIV or AIDS Should Know About Oral Thrush (Oropharyngeal Candidiasis) : Answers to Important Questions**

Contact: Pfizer Pharmaceuticals, 235 E 42nd St, New York, NY, 10017-5755, (212) 573-2323, <http://www.pfizer.com>.

Summary: This brochure discusses oral thrush (oropharyngeal candidiasis), how it is treated, and how to prevent it. The brochure describes oral thrush's appearance and how it develops; people with suppressed or depressed immune systems are particularly vulnerable. Oral thrush treatment (with antifungals) is described and the fact that the condition is not serious if treated correctly. The brochure includes information about how to reduce the risk of developing oral thrush.

- **Oropharyngeal Candidiasis (Oral Thrush)**

Contact: Pfizer Pharmaceuticals, 235 E 42nd St, New York, NY, 10017-5755, (212) 573-2323, <http://www.pfizer.com>.

Summary: This brochure uses a question-and-answer format to discuss oropharyngeal candidiasis (oral thrush). It details what the disease is, how it is transmitted, and methods of treatment. The brochure informs the reader that oral thrush is not a serious condition when treated, and suggests things to do to reduce the risk of reinfection.

### **The NLM Gateway<sup>27</sup>**

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.<sup>28</sup> 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,

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<sup>27</sup> Adapted from NLM: <http://gateway.nlm.nih.gov/gw/Cmd?Overview.x>.

<sup>28</sup> 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).

and the public.<sup>29</sup> To use the NLM Gateway, simply go to the search site at <http://gateway.nlm.nih.gov/gw/Cmd>. Type “oropharyngeal candidiasis” (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	344704
Books / Periodicals / Audio Visual	2564
Consumer Health	292
Meeting Abstracts	3093
Other Collections	100
Total	350753

### HSTAT<sup>30</sup>

HSTAT is a free, Web-based resource that provides access to full-text documents used in healthcare decision-making.<sup>31</sup> 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.<sup>32</sup> Simply search by “oropharyngeal

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<sup>29</sup> 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 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.

<sup>30</sup> Adapted from HSTAT: <http://www.nlm.nih.gov/pubs/factsheets/hstat.html>.

<sup>31</sup> The HSTAT URL is <http://hstat.nlm.nih.gov/>.

<sup>32</sup> 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

candidiasis" (or synonyms) at the following Web site:  
<http://text.nlm.nih.gov>.

### **Coffee Break: Tutorials for Biologists<sup>33</sup>**

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.<sup>34</sup> 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.<sup>35</sup> 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 the following hyperlink:  
<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/clinweb/>.
- **Image Engine:** Multimedia electronic medical record system that integrates a wide range of digitized clinical images with textual data

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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.

<sup>33</sup> Adapted from <http://www.ncbi.nlm.nih.gov/Coffeebreak/Archive/FAQ.html>.

<sup>34</sup> 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.

<sup>35</sup> 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.

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 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 the following Web site: <http://www.lexical.com/Metaphrase.html>.

## Specialized References

The following books are specialized references written for professionals interested in oropharyngeal candidiasis (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>
- **Bacterial Infections of Humans: Epidemiology and Control** by Alfred S. Evans (Editor), et al; Hardcover - 887 pages, 3rd edition (July 15, 1998), Plenum Publishing Corporation; ISBN: 0306453207; <http://www.amazon.com/exec/obidos/ASIN/0306453207/icongroupinterna>
- **Cellular Microbiology : Bacteria-Host Interactions in Health and Disease** by Brian Henderson, et al; Hardcover - 478 pages (May 28, 1999), John Wiley & Sons; ISBN: 047198678X; <http://www.amazon.com/exec/obidos/ASIN/047198678X/icongroupinterna>
- **The Comprehensive Sourcebook of Bacterial Protein Toxins** by Joseph E. Alouf (Editor), John H. Freer (Editor); Hardcover - 718 pages, 2nd edition (August 15, 1999), Academic Press; ISBN: 0120530759; <http://www.amazon.com/exec/obidos/ASIN/0120530759/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/iconegroupinterna>

- **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/iconegroupinterna>
- **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/iconegroupinterna>
- **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/iconegroupinterna>
- **Laboratory Diagnosis of Bacterial Infections (Infectious Disease and Therapy, Vol 26)** by Nevio Cimolai (Editor); Hardcover (August 2001), Marcel Dekker; ISBN: 0824705890;  
<http://www.amazon.com/exec/obidos/ASIN/0824705890/iconegroupinterna>
- **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/iconegroupinterna>
- **Molecular Bacteriology: Protocols and Clinical Applications** by Neil Woodford (Editor), Alan Johnson (Editor); Hardcover - 682 pages, 1st edition (June 15, 1998), Humana Press; ISBN: 0896034984;  
<http://www.amazon.com/exec/obidos/ASIN/0896034984/iconegroupinterna>
- **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/iconegroupinterna>
- **Persistent Bacterial Infections** by James P. Nataro (Editor), et al; Hardcover (June 2000), American Society for Microbiology; ISBN: 1555811590;  
<http://www.amazon.com/exec/obidos/ASIN/1555811590/iconegroupinterna>

## Vocabulary Builder

**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]



## **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 oropharyngeal candidiasis 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 oropharyngeal candidiasis. 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 oropharyngeal candidiasis. Research can give you information on the side effects, interactions, and limitations of prescription drugs used in the treatment of oropharyngeal candidiasis. 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<sup>36</sup>

The Agency for Health Care Research and Quality has published extremely useful guidelines on how you can best participate in the medication aspects of oropharyngeal candidiasis. 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 oropharyngeal candidiasis 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 oropharyngeal candidiasis. 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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<sup>36</sup> 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 oropharyngeal candidiasis). 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 oropharyngeal candidiasis. 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](http://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.<sup>37</sup>

While the FDA database is rather large and difficult to navigate, the Pharmacopeia 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 oropharyngeal candidiasis. 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 oropharyngeal candidiasis:

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<sup>37</sup> Though cumbersome, the FDA database can be freely browsed at the following site: [www.fda.gov/cder/da/da.htm](http://www.fda.gov/cder/da/da.htm).

**Ciclopirox**

- **Topical - U.S. Brands:** Loprox  
<http://www.nlm.nih.gov/medlineplus/druginfo/ciclopiroxtopical202140.html>

**Econazole**

- **Topical - U.S. Brands:** Spectazole  
<http://www.nlm.nih.gov/medlineplus/druginfo/econazoletopical202211.html>

**Nystatin and Triamcinolone**

- **Topical - U.S. Brands:** Dermacomb; Mykacet; Mytrex  
<http://www.nlm.nih.gov/medlineplus/druginfo/nystatinandtriamcinolonetopical202420.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 oropharyngeal candidiasis (including those with contraindications):<sup>38</sup>

- **Atovaquone**  
<http://www.reutershealth.com/atoz/html/Atovaquone.htm>
- **Azithromycin**  
<http://www.reutershealth.com/atoz/html/Azithromycin.htm>
- **Basiliximab**  
<http://www.reutershealth.com/atoz/html/Basiliximab.htm>
- **Butoconazole Nitrate**  
[http://www.reutershealth.com/atoz/html/Butoconazole\\_Nitrate.htm](http://www.reutershealth.com/atoz/html/Butoconazole_Nitrate.htm)

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<sup>38</sup> Adapted from *A to Z Drug Facts* by Facts and Comparisons.

- **Cefdinir**  
<http://www.reutershealth.com/atoz/html/Cefdinir.htm>
- **Cefepime**  
<http://www.reutershealth.com/atoz/html/Cefepime.htm>
- **Clarithromycin**  
<http://www.reutershealth.com/atoz/html/Clarithromycin.htm>
- **Clotrimazole**  
<http://www.reutershealth.com/atoz/html/Clotrimazole.htm>
- **Delavirdine Mesylate**  
[http://www.reutershealth.com/atoz/html/Delavirdine\\_Mesylate.htm](http://www.reutershealth.com/atoz/html/Delavirdine_Mesylate.htm)
- **Fluconazole**  
<http://www.reutershealth.com/atoz/html/Fluconazole.htm>
- **Fluticasone Propionate**  
[http://www.reutershealth.com/atoz/html/Fluticasone\\_Propionate.htm](http://www.reutershealth.com/atoz/html/Fluticasone_Propionate.htm)
- **Gatifloxacin**  
<http://www.reutershealth.com/atoz/html/Gatifloxacin.htm>
- **Glatiramer Acetate**  
[http://www.reutershealth.com/atoz/html/Glatiramer\\_Acetate.htm](http://www.reutershealth.com/atoz/html/Glatiramer_Acetate.htm)
- **Infliximab**  
<http://www.reutershealth.com/atoz/html/Infliximab.htm>
- **Itraconazole**  
<http://www.reutershealth.com/atoz/html/Itraconazole.htm>
- **Linezolid**  
<http://www.reutershealth.com/atoz/html/Linezolid.htm>
- **Loracarbef**  
<http://www.reutershealth.com/atoz/html/Loracarbef.htm>
- **Miconazole**  
<http://www.reutershealth.com/atoz/html/Miconazole.htm>
- **Mycophenolate Mofetil**  
[http://www.reutershealth.com/atoz/html/Mycophenolate\\_Mofetil.htm](http://www.reutershealth.com/atoz/html/Mycophenolate_Mofetil.htm)
- **Pamidronate Disodium**  
[http://www.reutershealth.com/atoz/html/Pamidronate\\_Disodium.htm](http://www.reutershealth.com/atoz/html/Pamidronate_Disodium.htm)
- **Piperacillin Sodium**  
[http://www.reutershealth.com/atoz/html/Piperacillin\\_Sodium.htm](http://www.reutershealth.com/atoz/html/Piperacillin_Sodium.htm)
- **Riluzole**  
<http://www.reutershealth.com/atoz/html/Riluzole.htm>

- **Sirolimus**  
<http://www.reutershealth.com/atoz/html/Sirolimus.htm>
- **Sparfloxacin**  
<http://www.reutershealth.com/atoz/html/Sparfloxacin.htm>
- **Tacrolimus**  
<http://www.reutershealth.com/atoz/html/Tacrolimus.htm>
- **Thalidomide**  
<http://www.reutershealth.com/atoz/html/Thalidomide.htm>

### **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](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](http://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 oropharyngeal candidiasis--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 oropharyngeal candidiasis or potentially create deleterious side effects in patients with oropharyngeal candidiasis. 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 oropharyngeal candidiasis. 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 oropharyngeal candidiasis. The FDA warns patients to watch out for<sup>39</sup>:

- 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.

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](http://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):

- **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>

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<sup>39</sup> This section has been adapted from <http://www.fda.gov/opacom/lowlit/medfraud.html>.

- **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>

## 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 oropharyngeal candidiasis. 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 oropharyngeal candidiasis may be given different recommendations. Some recommendations may be directly related to oropharyngeal candidiasis, 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 oropharyngeal candidiasis. We will then show you how to find studies dedicated specifically to nutrition and oropharyngeal candidiasis.

## 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<sup>1</sup>**, 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<sup>2</sup>**, 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<sup>3</sup>**, 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<sup>6</sup>**, 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<sup>12</sup>** is vital for a healthy nervous system and for the growth of red blood cells in bone marrow; food sources for vitamin B12 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:<sup>40</sup>

- **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.

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<sup>40</sup> Adapted from the FDA: <http://www.fda.gov/fdac/special/foodlabel/dvs.html>.

- **DRVs (Daily Reference Values):** A set of dietary references that applies to fat, saturated fat, cholesterol, carbohydrate, protein, fiber, sodium, and potassium.
- **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?<sup>41</sup>

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.”<sup>42</sup> According to the ODS, dietary supplements can have an important impact on the prevention and management of disease and on the maintenance of health.<sup>43</sup> The ODS notes that considerable research on the

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<sup>41</sup> This discussion has been adapted from the NIH:

<http://ods.od.nih.gov/whatare/whatare.html>.

<sup>42</sup> 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](mailto:ods@nih.gov).

<sup>43</sup> 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,

effects of dietary supplements has been conducted in Asia and Europe where 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](mailto:ods@nih.gov)

## Finding Studies on Oropharyngeal Candidiasis

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.<sup>44</sup> IBIDS is available to the public free of charge through the ODS Internet page: <http://ods.od.nih.gov/databases/ibids.html>.

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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."

<sup>44</sup> 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.

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 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 “oropharyngeal candidiasis” (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 “oropharyngeal candidiasis” (or a synonym):

- **Association of psychotropic drugs, prevalence of denture-related stomatitis and oral candidosis.**  
 Author(s): Department of Prosthetic Dentistry, United Medical School, Guy's Hospital, London, United Kingdom.  
 Source: Lucas, V S Community-Dent-Oral-Epidemiol. 1993 October; 21(5): 313-6 0301-5661

## 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](http://www.nutrition.gov)
- The Food and Drug Administration's Web site for federal food safety information: [www.foodsafety.gov](http://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](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>

The following is a specific Web list relating to oropharyngeal candidiasis; please note that any particular subject below may indicate either a therapeutic use, or a contraindication (potential danger), and does not reflect an official recommendation:

- **Minerals**

- **Nystatin Oral**

- Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

- Hyperlink:

- [http://www.thedacare.org/healthnotes/Drug/Nystatin\\_Oral.htm](http://www.thedacare.org/healthnotes/Drug/Nystatin_Oral.htm)

- **Food and Diet**

**Cinnamon**

Alternative names: *Cinnamomum zeylanicum*

Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

Hyperlink:

<http://www.thedacare.org/healthnotes/Herb/Cinnamon.htm>

## Vocabulary Builder

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

**Azithromycin:** A semi-synthetic macrolide antibiotic structurally related to erythromycin. It has been used in the treatment of *Mycobacterium avium* intracellular infections, toxoplasmosis, and cryptosporidiosis. [NIH]

**Clarithromycin:** A semisynthetic macrolide antibiotic derived from erythromycin that is active against a variety of microorganisms. It can inhibit protein synthesis in bacteria by reversibly binding to the 50S ribosomal subunits. This inhibits the translocation of aminoacyl transfer-RNA and prevents peptide chain elongation. [NIH]

**Econazole:** A broad spectrum antimycotic with some action against Gram positive bacteria. It is used topically in dermatomycoses also orally and parenterally. [NIH]

**Riluzole:** A glutamate antagonist that has reported anticonvulsant activity. It has been shown to prolong the survival of patients with amyotrophic lateral sclerosis and has been approved in the United States to treat patients with ALS. [NIH]

**Sirolimus:** A macrolide compound obtained from *Streptomyces hygroscopicus* that acts by selectively blocking the transcriptional activation of cytokines thereby inhibiting cytokine production. It is bioactive only when bound to immunophilins. Sirolimus is a potent immunosuppressant and possesses both antifungal and antineoplastic properties. [NIH]

**Tacrolimus:** A macrolide isolated from the culture broth of a strain of *Streptomyces tsukubaensis* that has strong immunosuppressive activity in vivo and prevents the activation of T-lymphocytes in response to antigenic or mitogenic stimulation in vitro. [NIH]

**Thalidomide:** A pharmaceutical agent originally introduced as a non-barbiturate hypnotic, but withdrawn from the market because of its known teratogenic effects. It has been reintroduced and used for a number of

immunological and inflammatory disorders. Thalidomide displays immunosuppressive and anti-angiogenic activity. It inhibits release of tumor necrosis factor alpha from monocytes, and modulates other cytokine action.  
[NIH]

## 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.<sup>45</sup>

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<sup>45</sup> 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://nmlm.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):<sup>46</sup>

- **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/>

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<sup>46</sup> 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/rdwplib.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](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](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](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.lsuhscc.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](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](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 Resource 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](http://www.lvccld.org/special_collections/medical/index.htm)
- **New Hampshire:** Dartmouth Biomedical Libraries (Dartmouth College Library), [http://www.dartmouth.edu/~biomed/resources.html#conshealth.html#](http://www.dartmouth.edu/~biomed/resources.html#conshealth.html#/)
- **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/koopp1.shtml>
- **Pennsylvania:** Learning Resources Center - Medical Library (Susquehanna Health System), <http://www.shscare.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://hwh.library.tmc.edu/>
- **Texas:** Matustik Family Resource Center (Cook Children's Health Care System), [http://www.cookchildrens.com/Matustik\\_Library.html](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 oropharyngeal candidiasis 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.<sup>47</sup>

#### 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

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<sup>47</sup>Adapted from Consumer Bill of Rights and Responsibilities:  
<http://www.hcqualitycommission.gov/press/cbor.html#head1>.

network composition, the procedures that govern access to specialists and emergency services, and care management information.

- **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.<sup>48</sup>

## 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."<sup>49</sup> 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.

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<sup>48</sup> 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.

<sup>49</sup> Adapted from <http://www.hcqualitycommission.gov/press/cbor.html#head1>.

- Use your health insurance plan's internal complaint and appeal processes to address your concerns.
- Avoid knowingly spreading disease.
- 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.<sup>50</sup> The U.S. Department of Labor, in particular, recommends ten ways to make your health benefits choices work best for you.<sup>51</sup>

**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

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<sup>50</sup> More information about quality across programs is provided at the following AHRQ Web site:

<http://www.ahrq.gov/consumer/qntascii/qnthplan.htm>.

<sup>51</sup> Adapted from the Department of Labor:

<http://www.dol.gov/dol/pwba/public/pubs/health/top10-text.html>.

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.

**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](http://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](http://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.<sup>52</sup>

### 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.

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<sup>52</sup> This section has been adapted from the Official U.S. Site for Medicare Information: <http://www.medicare.gov/Basics/Overview.asp>.

### **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.

**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 underinsured individuals secure life-saving or life-sustaining drugs.<sup>53</sup> NORD 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](http://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:<sup>54</sup>

- 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>

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<sup>53</sup> Adapted from NORD: [http://www.rarediseases.org/cgi-bin/nord/progserv#patient?id=rPIzL9oD&mv\\_pc=30](http://www.rarediseases.org/cgi-bin/nord/progserv#patient?id=rPIzL9oD&mv_pc=30).

<sup>54</sup> You can access this information at:  
<http://www.nlm.nih.gov/medlineplus/healthsystem.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>

## Vocabulary Builder

**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, (CH<sub>2</sub>O)<sub>n</sub>. 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]

**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]

**Overdose:** 1. to administer an excessive dose. 2. an excessive dose. [EU]

**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]

**Psychotropic:** Exerting an effect upon the mind; capable of modifying mental activity; usually applied to drugs that effect the mental state. [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]

**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]

**Stomatitis:** Inflammation of the oral mucosa, due to local or systemic factors which may involve the buccal and labial mucosa, palate, tongue, floor of the mouth, and the gingivae. [EU]

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

**Thyroxine:** An amino acid of the thyroid gland which exerts a stimulating effect on thyroid metabolism. [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](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 drkoop.com (<http://www.drkoop.com/>) and Web MD ([http://my.webmd.com/adam/asset/adam\\_disease\\_articles/a\\_to\\_z/a](http://my.webmd.com/adam/asset/adam_disease_articles/a_to_z/a)). 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 oropharyngeal candidiasis 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/](http://dmoz.org/Health/Education/Patient_Education/Glossaries/)**
- Web of Online Dictionaries (Bucknell University):  
**<http://www.yourdictionary.com/diction5.html#medicine>**

## OROPHARYNGEAL CANDIDIASIS 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.

**Anesthesia:** A state characterized by loss of feeling or sensation. This depression of nerve function is usually the result of pharmacologic action and is induced to allow performance of surgery or other painful procedures. [NIH]

**Antibacterial:** A substance that destroys bacteria or suppresses their growth or reproduction. [EU]

**Antibiotic:** A chemical substance produced by a microorganism which has the capacity, in dilute solutions, to inhibit the growth of or to kill other microorganisms. Antibiotics that are sufficiently nontoxic to the host are used as chemotherapeutic agents in the treatment of infectious diseases of man, animals and plants. [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 mode of action as agglutinins, bacteriolysins, haemolysins, opsonins, precipitins, etc. [EU]

**Antifungal:** Destructive to fungi, or suppressing their reproduction or growth; effective against fungal infections. [EU]

**Antigens:** Substances that are recognized by the immune system and induce an immune reaction. [NIH]

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

**Antimycotic:** Suppressing the growth of fungi. [EU]

**Azithromycin:** A semi-synthetic macrolide antibiotic structurally related to erythromycin. It has been used in the treatment of *Mycobacterium avium* intracellular infections, toxoplasmosis, and cryptosporidiosis. [NIH]

**Benign:** Not malignant; not recurrent; favourable for recovery. [EU]

**Biopsy:** The removal and examination, usually microscopic, of tissue from

the living body, performed to establish precise diagnosis. [EU]

**Candidiasis:** Infection with a fungus of the genus *Candida*. It is usually a superficial infection of the moist cutaneous areas of the body, and is generally caused by *C. albicans*; it most commonly involves the skin (dermatocandidiasis), oral mucous membranes (thrush, def. 1), respiratory tract (bronchocandidiasis), and vagina (vaginitis). Rarely there is a systemic infection or endocarditis. Called also moniliasis, candidosis, oidiomycosis, and formerly blastodendriosis. [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,  $(CH_2O)_n$ . The most important carbohydrates are the starches, sugars, celluloses, and gums. They are classified into mono-, di-, tri-, poly- and heterosaccharides. [EU]

**Cheilitis:** Inflammation of the lips. It is of various etiologies and degrees of pathology. [NIH]

**Chemotherapy:** The treatment of disease by means of chemicals that have a specific toxic effect upon the disease - producing microorganisms or that selectively destroy cancerous tissue. [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]

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

**Cineradiography:** Motion picture study of successive images appearing on a fluoroscopic screen. [NIH]

**Clarithromycin:** A semisynthetic macrolide antibiotic derived from erythromycin that is active against a variety of microorganisms. It can inhibit protein synthesis in bacteria by reversibly binding to the 50S ribosomal subunits. This inhibits the translocation of aminoacyl transfer-RNA and prevents peptide chain elongation. [NIH]

**Clotrimazole:** An imidazole derivative with a broad spectrum of antimycotic activity. It inhibits biosynthesis of the sterol ergosterol, an important component of fungal cell membranes. Its action leads to increased membrane permeability and apparent disruption of enzyme systems bound to the membrane. [NIH]

**Commensal:** 1. living on or within another organism, and deriving benefit without injuring or benefiting the other individual. 2. an organism living on or within another, but not causing injury to the host. [EU]

**Contraceptive:** An agent that diminishes the likelihood of or prevents

conception. [EU]

**Cryptococcosis:** Infection with a fungus of the species *Cryptococcus neoformans*. [NIH]

**Cytokines:** Non-antibody proteins secreted by inflammatory leukocytes and some non-leukocytic cells, that act as intercellular mediators. They differ from classical hormones in that they are produced by a number of tissue or cell types rather than by specialized glands. They generally act locally in a paracrine or autocrine rather than endocrine manner. [NIH]

**Cytotoxic:** Pertaining to or exhibiting cytotoxicity. [EU]

**Defensins:** Family of antimicrobial peptides that have been identified in humans, animals, and plants. They are thought to play a role in host defenses against infections, inflammation, wound repair, and acquired immunity. Based on the disulfide pairing of their characteristic six cysteine residues, they are divided into alpha-defensins and beta-defensins. [NIH]

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

**Dentition:** The teeth in the dental arch; ordinarily used to designate the natural teeth in position in their alveoli. [EU]

**Dentures:** An appliance used as an artificial or prosthetic replacement for missing teeth and adjacent tissues. It does not include crowns, dental abutments, nor tooth, artificial. [NIH]

**Dermatology:** A medical specialty concerned with the skin, its structure, functions, diseases, and treatment. [NIH]

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

**Dysphagia:** Difficulty in swallowing. [EU]

**Econazole:** A broad spectrum antimycotic with some action against Gram positive bacteria. It is used topically in dermatomycoses also orally and parenterally. [NIH]

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

**Endocarditis:** Exudative and proliferative inflammatory alterations of the endocardium, characterized by the presence of vegetations on the surface of the endocardium or in the endocardium itself, and most commonly involving a heart valve, but sometimes affecting the inner lining of the cardiac chambers or the endocardium elsewhere. It may occur as a primary disorder or as a complication of or in association with another disease. [EU]

**Endogenous:** Developing or originating within the organisms or arising from causes within the organism. [EU]

**Endophthalmitis:** Suppurative inflammation of the tissues of the internal structures of the eye; not all layers of the uvea are affected. Fungi, necrosis of intraocular tumors, and retained intraocular foreign bodies often cause a purulent endophthalmitis. [NIH]

**Enzyme:** A protein molecule that catalyses chemical reactions of other substances without itself being destroyed or altered upon completion of the reactions. Enzymes are classified according to the recommendations of the Nomenclature Committee of the International Union of Biochemistry. Each enzyme is assigned a recommended name and an Enzyme Commission (EC) number. They are divided into six main groups; oxidoreductases, transferases, hydrolases, lyases, isomerases, and ligases. [EU]

**Epithelium:** The covering of internal and external surfaces of the body, including the lining of vessels and other small cavities. It consists of cells joined by small amounts of cementing substances. Epithelium is classified into types on the basis of the number of layers deep and the shape of the superficial cells. [EU]

**Erythema:** A name applied to redness of the skin produced by congestion of the capillaries, which may result from a variety of causes, the etiology or a specific type of lesion often being indicated by a modifying term. [EU]

**Esophagitis:** Inflammation, acute or chronic, of the esophagus caused by bacteria, chemicals, or trauma. [NIH]

**Fatigue:** The state of weariness following a period of exertion, mental or physical, characterized by a decreased capacity for work and reduced efficiency to respond to stimuli. [NIH]

**Fluconazole:** Triazole antifungal agent that is used to treat oropharyngeal candidiasis and cryptococcal meningitis in AIDS. [NIH]

**Fungus:** A general term used to denote a group of eukaryotic protists, including mushrooms, yeasts, rusts, moulds, smuts, etc., which are characterized by the absence of chlorophyll and by the presence of a rigid cell wall composed of chitin, mannans, and sometimes cellulose. They are usually of simple morphological form or show some reversible cellular specialization, such as the formation of pseudoparenchymatous tissue in the fruiting body of a mushroom. The dimorphic fungi grow, according to environmental conditions, as moulds or yeasts. [EU]

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

**Gastroscopy:** Endoscopic examination, therapy or surgery of the interior of the stomach. [NIH]

**Granulocytopenia:** Agranulocytosis. [EU]

**Gynecology:** A medical-surgical specialty concerned with the physiology

and disorders primarily of the female genital tract, as well as female endocrinology and reproductive physiology. [NIH]

**Herpes:** Any inflammatory skin disease caused by a herpesvirus and characterized by the formation of clusters of small vesicles. When used alone, the term may refer to herpes simplex or to herpes zoster. [EU]

**Humoral:** Of, relating to, proceeding from, or involving a bodily humour - now often used of endocrine factors as opposed to neural or somatic. [EU]

**Immunity:** The condition of being immune; the protection against infectious disease conferred either by the immune response generated by immunization or previous infection or by other nonimmunologic factors (innate i.). [EU]

**Immunohistochemistry:** Histochemical localization of immunoreactive substances using labeled antibodies as reagents. [NIH]

**Induction:** The act or process of inducing or causing to occur, especially the production of a specific morphogenetic effect in the developing embryo through the influence of evocators or organizers, or the production of anaesthesia or unconsciousness by use of appropriate agents. [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]

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

**Invasive:** 1. having the quality of invasiveness. 2. involving puncture or incision of the skin or insertion of an instrument or foreign material into the body; said of diagnostic techniques. [EU]

**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]

**Itraconazole:** An antifungal agent that has been used in the treatment of histoplasmosis, blastomycosis, cryptococcal meningitis, and aspergillosis. [NIH]

**Ketoconazole:** Broad spectrum antifungal agent used for long periods at high doses, especially in immunosuppressed patients. [NIH]

**Kinetic:** Pertaining to or producing motion. [EU]

**Lesion:** Any pathological or traumatic discontinuity of tissue or loss of function of a part. [EU]

**Manifest:** Being the part or aspect of a phenomenon that is directly

observable : concretely expressed in behaviour. [EU]

**Membrane:** A thin layer of tissue which covers a surface, lines a cavity or divides a space or organ. [EU]

**Meningitis:** Inflammation of the meninges. When it affects the dura mater, the disease is termed pachymeningitis; when the arachnoid and pia mater are involved, it is called leptomeningitis, or meningitis proper. [EU]

**Miconazole:** An imidazole antifungal agent that is used topically and by intravenous infusion. [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]

**Mucocutaneous:** Pertaining to or affecting the mucous membrane and the skin. [EU]

**Mycotic:** Pertaining to a mycosis; caused by fungi. [EU]

**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]

**Nosocomial:** Pertaining to or originating in the hospital, said of an infection not present or incubating prior to admittance to the hospital, but generally occurring 72 hours after admittance; the term is usually used to refer to patient disease, but hospital personnel may also acquire nosocomial infection. [EU]

**Nystatin:** Macrolide antifungal antibiotic complex produced by *Streptomyces noursei*, *S. aureus*, and other *Streptomyces* species. The biologically active components of the complex are nystatin A1, A2, and A3. [NIH]

**Obstetrics:** A medical-surgical specialty concerned with management and care of women during pregnancy, parturition, and the puerperium. [NIH]

**Oral:** Pertaining to the mouth, taken through or applied in the mouth, as an oral medication or an oral thermometer. [EU]

**Oropharynx:** Oral part of the pharynx. [NIH]

**Osteomyelitis:** Inflammation of bone caused by a pyogenic organism. It may remain localized or may spread through the bone to involve the marrow, cortex, cancellous tissue, and periosteum. [EU]

**Otolaryngology:** A surgical specialty concerned with the study and treatment of disorders of the ear, nose, and throat. [NIH]

**Overdose:** 1. to administer an excessive dose. 2. an excessive dose. [EU]

**Pediatrics:** A medical specialty concerned with maintaining health and providing medical care to children from birth to adolescence. [NIH]

**Pediculosis:** Infestation with lice of the family Pediculidae, especially infestation with *Pediculus humanus*. [EU]

**Periodontics:** A dental specialty concerned with the histology, physiology, and pathology of the tissues that support, attach, and surround the teeth, and of the treatment and prevention of disease affecting these tissues. [NIH]

**Pharmacists:** Those persons legally qualified by education and training to engage in the practice of pharmacy. [NIH]

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

**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]

**Progressive:** Advancing; going forward; going from bad to worse; increasing in scope or severity. [EU]

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

**Prosthodontics:** A dental specialty concerned with the restoration and maintenance of oral function by the replacement of missing teeth and structures by artificial devices or prostheses. [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]

**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]

**Psychotropic:** Exerting an effect upon the mind; capable of modifying mental activity; usually applied to drugs that effect the mental state. [EU]

**Radiology:** A specialty concerned with the use of x-ray and other forms of radiant energy in the diagnosis and treatment of disease. [NIH]

**Receptor:** 1. a molecular structure within a cell or on the surface

characterized by (1) selective binding of a specific substance and (2) a specific physiologic effect that accompanies the binding, e.g., cell-surface receptors for peptide hormones, neurotransmitters, antigens, complement fragments, and immunoglobulins and cytoplasmic receptors for steroid hormones. 2. a sensory nerve terminal that responds to stimuli of various kinds. [EU]

**Recurrence:** The return of a sign, symptom, or disease after a remission. [NIH]

**Refractory:** Not readily yielding to treatment. [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]

**Riluzole:** A glutamate antagonist that has reported anticonvulsant activity. It has been shown to prolong the survival of patients with amyotrophic lateral sclerosis and has been approved in the United States to treat patients with ALS. [NIH]

**Saccharomyces:** A genus of ascomycetous fungi of the family Saccharomycetaceae, order saccharomycetales. [NIH]

**Scabies:** A contagious dermatitis of humans and various wild and domestic animals caused by the itch mite, *Sarcoptes scabiei*, transmitted by close contact, and characterized by a papular eruption over tiny, raised sinuous burrows (cuniculi) produced by digging into the upper layer of the epidermis by the egg-laying female mite, which is accompanied by intense pruritus and sometimes associated with eczema from scratching and secondary bacterial infection. Called also the itch and seven-year itch. [EU]

**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]

**Serum:** The clear portion of any body fluid; the clear fluid moistening serous membranes. 2. blood serum; the clear liquid that separates from blood on clotting. 3. immune serum; blood serum from an immunized animal used for passive immunization; an antiserum; antitoxin, or antivenin. [EU]

**Sirolimus:** A macrolide compound obtained from *Streptomyces hygroscopicus* that acts by selectively blocking the transcriptional activation of cytokines thereby inhibiting cytokine production. It is bioactive only when bound to immunophilins. Sirolimus is a potent immunosuppressant and

possesses both antifungal and antineoplastic properties. [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]

**Steroid:** A group name for lipids that contain a hydrogenated cyclopentanoperhydrophenanthrene ring system. Some of the substances included in this group are progesterone, adrenocortical hormones, the gonadal hormones, cardiac aglycones, bile acids, sterols (such as cholesterol), toad poisons, saponins, and some of the carcinogenic hydrocarbons. [EU]

**Stomatitis:** Inflammation of the oral mucosa, due to local or systemic factors which may involve the buccal and labial mucosa, palate, tongue, floor of the mouth, and the gingivae. [EU]

**Suppressive:** Tending to suppress : effecting suppression; specifically : serving to suppress activity, function, symptoms. [EU]

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

**Tacrolimus:** A macrolide isolated from the culture broth of a strain of *Streptomyces tsukubaensis* that has strong immunosuppressive activity in vivo and prevents the activation of T-lymphocytes in response to antigenic or mitogenic stimulation in vitro. [NIH]

**Thalidomide:** A pharmaceutical agent originally introduced as a non-barbiturate hypnotic, but withdrawn from the market because of its known teratogenic effects. It has been reintroduced and used for a number of immunological and inflammatory disorders. Thalidomide displays immunosuppressive and anti-angiogenic activity. It inhibits release of tumor necrosis factor alpha from monocytes, and modulates other cytokine action. [NIH]

**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]

**Topical:** Pertaining to a particular surface area, as a topical anti-infective applied to a certain area of the skin and affecting only the area to which it is applied. [EU]

**Toxicity:** The quality of being poisonous, especially the degree of virulence

of a toxic microbe or of a poison. [EU]

**Toxoplasmosis:** An acute or chronic, widespread disease of animals and humans caused by the obligate intracellular protozoon *Toxoplasma gondii*, transmitted by oocysts containing the pathogen in the feces of cats (the definitive host), usually by contaminated soil, direct exposure to infected feces, tissue cysts in infected meat, or tachyzoites (proliferating forms) in blood. [EU]

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

**Tumour:** 1. swelling, one of the cardinal signs of inflammations; morbid enlargement. 2. a new growth of tissue in which the multiplication of cells is uncontrolled and progressive; called also neoplasm. [EU]

**Vaccine:** A suspension of attenuated or killed microorganisms (bacteria, viruses, or rickettsiae), administered for the prevention, amelioration or treatment of infectious diseases. [EU]

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

**Virulence:** The degree of pathogenicity within a group or species of microorganisms or viruses as indicated by case fatality rates and/or the ability of the organism to invade the tissues of the host. [NIH]

**Yeasts:** A general term for single-celled rounded fungi that reproduce by budding. Brewers' and bakers' yeasts are *saccharomyces cerevisiae*; therapeutic dried yeast is yeast, dried. [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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