THE OFFICIAL
PATIENT'S SOURCEBOOK
on

TYPHOID FEVER

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Dedication

To the healthcare professionals dedicating their time and efforts to the study of typhoid fever.

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

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About ICON Health Publications

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- The Official Patient's Sourcebook on Bacterial Waterborne Diseases
- The Official Patient's Sourcebook on Blastomycosis
- The Official Patient's Sourcebook on Botulism
- The Official Patient's Sourcebook on Brainerd Diarrhea
- The Official Patient's Sourcebook on Brucellosis
- The Official Patient's Sourcebook on Campylobacteriosis
- The Official Patient's Sourcebook on Chlamydia Pneumonia
- The Official Patient's Sourcebook on Cholera
- The Official Patient's Sourcebook on Coccidioidomycosis
- The Official Patient's Sourcebook on Cryptococcosis
- The Official Patient's Sourcebook on Diarrheagenic Escherichia Coli
- The Official Patient's Sourcebook on Diphtheria
- The Official Patient's Sourcebook on Drug-resistant Streptococcus Pneumoniae
- The Official Patient's Sourcebook on Enterotoxigenic E. Coli
- The Official Patient's Sourcebook on Escherichia Coli
- The Official Patient's Sourcebook on Food Irradiation
- The Official Patient's Sourcebook on Foodborne Disease
- The Official Patient's Sourcebook on Genital Candidiasis
- The Official Patient's Sourcebook on Glanders
- The Official Patient's Sourcebook on Group A Streptococcus
- The Official Patient's Sourcebook on Group B Streptococcus
- The Official Patient's Sourcebook on Haemophilus Influenzae Serotype B
- The Official Patient's Sourcebook on Hansen's Disease
- The Official Patient's Sourcebook on Helicobacter Pylori Infections
- The Official Patient's Sourcebook on Histoplasmosis
- The Official Patient's Sourcebook on Invasive Candidiasis
- The Official Patient's Sourcebook on Legionellosis
- The Official Patient's Sourcebook on Leptospirosis
- The Official Patient's Sourcebook on Leptospirosis Infection in Pets
- The Official Patient's Sourcebook on Listeriosis
- The Official Patient's Sourcebook on Melioidosis
- The Official Patient's Sourcebook on Meningitis
- The Official Patient's Sourcebook on Mycobacterium Avium Complex

- The Official Patient's Sourcebook on Mycoplasma Pneumoniae
- The Official Patient's Sourcebook on Nocardiosis
- The Official Patient's Sourcebook on Oropharyngeal Candidiasis
- 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
- The Official Patient's Sourcebook on Salmonella Enteritidis Infection
- The Official Patient's Sourcebook on Salmonellosis
- The Official Patient's Sourcebook on Shigellosis
- The Official Patient's Sourcebook on Sporotrichosis
- The Official Patient's Sourcebook on Streptococcus Pneumoniae Disease
- The Official Patient's Sourcebook on Toxic Shock Syndrome
- The Official Patient's Sourcebook on Trachoma
- The Official Patient's Sourcebook on Travelers Diarrhea
- The Official Patient's Sourcebook on Unexplained Deaths & Critical Illnesses
- The Official Patient's Sourcebook on Urinary Tract Infections
- The Official Patient's Sourcebook on Vibrio Parahaemolyticus
- The Official Patient's Sourcebook on Vibrio Vulnificus
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INTRODUCTION

Overview

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

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

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

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

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

Since the late 1990s, physicians have seen a general increase in patient Internet usage rates. Patients frequently enter their doctor's offices with printed Web pages of home remedies in the guise of latest medical research. This scenario is so common that doctors often spend more time dispelling misleading information than guiding patients through sound therapies. *The Official Patient's Sourcebook on Typhoid Fever* 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 typhoid fever, 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 typhoid fever.

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

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

Scope

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

- Enteric Fever
- Salmonella Typhi Infection
- Typhoid

- Typhoid Fever
- Typhus Abdominalis

In addition to synonyms and related conditions, physicians may refer to typhoid fever 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 typhoid fever:[4]

- 002.0 typhoid and paratyphoid fevers

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 typhoid fever. You may find it useful to refer to synonyms when accessing databases or interacting with healthcare professionals and medical librarians.

Moving Forward

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

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

Why "Internet age"? All too often, patients diagnosed with typhoid fever 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

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

patients are left to wonder where the relevant information is, and how to obtain it. Since only the smallest fraction of information dealing with typhoid fever 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 typhoid fever, 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 typhoid fever. 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 typhoid fever to you or even given you a pamphlet or brochure describing typhoid fever. 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 TYPHOID FEVER: GUIDELINES

Overview

Official agencies, as well as federally-funded institutions supported by national grants, frequently publish a variety of guidelines on typhoid fever. 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 typhoid fever 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)[5]

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

[5] 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 typhoid fever 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.[6] 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 typhoid fever.

What Is Typhoid Fever?[7]

Typhoid fever is a life-threatening illness caused by the bacterium Salmonella Typhi. In the United States about 400 cases occur each year, and 70% of these are acquired while traveling internationally. Typhoid fever is

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[6] 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.

[7] Adapted from The Centers for Disease Control and Prevention (CDC): **http://www.cdc.gov/ncidod/dbmd/diseaseinfo/typhoidfever_g.htm**.

still common in the developing world, where it affects about 12.5 million persons each year.

Typhoid fever can be prevented and can usually be treated with antibiotics. If you are planning to travel outside the United States, you should know about typhoid fever and what steps you can take to protect yourself.

How Is Typhoid Fever Spread?

Salmonella Typhi lives only in humans. Persons with typhoid fever carry the bacteria in their bloodstream and intestinal tract. In addition, a small number of persons, called carriers, recover from typhoid fever but continue to carry the bacteria. Both ill persons and carriers shed S. Typhi in their feces (stool).

You can get typhoid fever if you eat food or drink beverages that have been handled by a person who is shedding S. Typhi or if sewage contaminated with S. Typhi bacteria gets into the water you use for drinking or washing food. Therefore, typhoid fever is more common in areas of the world where hand washing is less frequent and water is likely to be contaminated with sewage.

Once S. Typhi bacteria are eaten or drunk, they multiply and spread into the bloodstream. The body reacts with fever and other signs and symptoms.

Where in the World Could You Get Typhoid Fever?

Typhoid fever is common in most parts of the world except in industrialized regions such as the United States, Canada, Western Europe, Australia, and Japan. Therefore, if you are traveling to the developing world, you should consider taking precautions. Over the past 10 years, travelers from the United States to Asia, Africa, and Latin America have been especially at risk.

How Can You Avoid Typhoid Fever?

Two basic actions can protect you from typhoid fever:

- Avoid risky foods and drinks.
- Get vaccinated against typhoid fever.

It may surprise you, but watching what you eat and drink when you travel is as important as being vaccinated. This is because the vaccines are not completely effective. Avoiding risky foods will also help protect you from other illnesses, including travelers' diarrhea, cholera, dysentery, and hepatitis A.

"Boil It, Cook It, Peel It, or Forget It"

- If you drink water, buy it bottled or bring it to a rolling boil for 1 minute before you drink it. Bottled carbonated water is safer than uncarbonated water.
- Ask for drinks without ice unless the ice is made from bottled or boiled water. Avoid popsicles and flavored ices that may have been made with contaminated water.
- Eat foods that have been thoroughly cooked and that are still hot and steaming.
- Avoid raw vegetables and fruits that cannot be peeled. Vegetables like lettuce are easily contaminated and are very hard to wash well.
- When you eat raw fruit or vegetables that can be peeled, peel them yourself. (Wash your hands with soap first.) Do not eat the peelings.
- Avoid foods and beverages from street vendors. It is difficult for food to be kept clean on the street, and many travelers get sick from food bought from street vendors.

Getting Vaccinated

If you are traveling to a country where typhoid is common, you should consider being vaccinated against typhoid. Visit a doctor or travel clinic to discuss your vaccination options.

Remember that you will need to complete your vaccination at least 1 week before you travel so that the vaccine has time to take effect. Typhoid vaccines lose effectiveness after several years; if you were vaccinated in the past, check with your doctor to see if it is time for a booster vaccination. Taking antibiotics will not prevent typhoid fever; they only help treat it.

The chart below provides basic information on typhoid vaccines that are available in the United States:

Vaccine Name	How given	Number of doses necessary	Time between doses	Total time needed to set aside for vaccination	Minimum age for vaccination	Booster needed every ...
Ty21a (Vivotif Berna, Swiss Serum and Vaccine Institute)	1 capsule by mouth	4	2 days	2 weeks	6 years	5 years
ViCPS (Typhim Vi, Pasteur Merieux)	Injection	1	N/A	1 week	2 years	2 years

The parenteral heat-phenol-inactivated vaccine (manufactured by Wyeth-Ayerst) has been discontinued.

What Are the Signs and Symptoms of Typhoid Fever?

Persons with typhoid fever usually have a sustained fever as high as 103° to 104° F (39° to 40° C). They may also feel weak, or have stomach pains, headache, or loss of appetite. In some cases, patients have a rash of flat, rose-colored spots. The only way to know for sure if an illness is typhoid fever is to have samples of stool or blood tested for the presence of S. Typhi.

What Do You Do If You Think You Have Typhoid Fever?

If you suspect you have typhoid fever, see a doctor immediately. If you are traveling in a foreign country, you can usually call the U.S. consulate for a list of recommended doctors.

You will probably be given an antibiotic to treat the disease. Three commonly prescribed antibiotics are ampicillin, trimethoprim-sulfamethoxazole, and ciprofloxacin. Persons given antibiotics usually begin to feel better within 2 to 3 days, and deaths rarely occur. However, persons who do not get treatment may continue to have fever for weeks or months, and as many as 20% may die from complications of the infection.

Typhoid Fever's Danger Doesn't End When Symptoms Disappear

Even if your symptoms seem to go away, you may still be carrying S. Typhi. If so, the illness could return, or you could pass the disease to other people. In fact, if you work at a job where you handle food or care for small children, you may be barred legally from going back to work until a doctor has determined that you no longer carry any typhoid bacteria.

If you are being treated for typhoid fever, it is important to do the following:

- Keep taking the prescribed antibiotics for as long as the doctor has asked you to take them.
- Wash your hands carefully with soap and water after using the bathroom, and do not prepare or serve food for other people. This will lower the chance that you will pass the infection on to someone else.
- Have your doctor perform a series of stool cultures to ensure that no S. typhi bacteria remain in your body.

Typhoid Fever: Technical Notes

The Division of Bacterial and Mycotic Diseases of the CDC publishes summary information on typhoid fever 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 typhoid fever that can help the doctor with diagnosis. It may also include a discussion of the cause or "etiology" of typhoid fever. "Etiologic agent" signifies the particular organism, typically written in Latin, which causes or is associated with typhoid fever. "Reservoir" indicates the habitat or living environment of the organism. "Incidence" describes the number of people that are diagnosed with typhoid fever within a given population. "Sequelae" includes any related health consequences or secondary pathological conditions and diseases that may result from typhoid fever. "Transmission" describes how a disease spreads. "Risk Groups" are people who are most likely to be diagnosed with typhoid fever. "Surveillance" describes how typhoid fever 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 typhoid fever in the future. The notes that follow were recently published by the CDC.[8]

Clinical Features

Typhoid fever has an insidious onset characterized by fever, headache, constipation, malaise, chills, and myalgia. Diarrhea is uncommon, and vomiting is not usually severe. Confusion, delirium, intestinal perforation, and death may occur in severe cases.

Etiologic Agent

Salmonella serogroup Typhi.

Incidence

400 cases per year in the United States, mostly among travelers. An estimated 16 million cases of typhoid fever and 600,000 deaths occur worldwide.

Sequelae

Without therapy, the illness may last for 3 to 4 weeks and death rates range between 12% and 30%.

Transmission

Contaminated drinking water or food. Large epidemics are most often related to fecal contamination of water supplies or street vended foods. A chronic carrier state--excretion of the organism for more than 1 year--occurs in approximately 5% of infected persons.

[8] Adapted from The Centers for Disease Control and Prevention (CDC): **http://www.cdc.gov/ncidod/dbmd/diseaseinfo/typhoidfever_t.htm**.

Risk Groups

Risk is very low in U.S.; higher among international travelers (i.e., 812 per 1 million travelers to India), and highest among persons living in poverty in the developing world.

Surveillance

All reported cases are laboratory-confirmed in states or at CDC.

Trends

Modest decrease in cases since 1994, possibly related to newly licensed vaccines marketed to international travelers.

Challenges

Increasing resistance to available antimicrobial agents, including fluoroquinolones, may foretell dramatic increases in case-fatality rates. Epidemics and high endemic disease rates have occurred in the Central Asian Republics, the Indian subcontinent, and across Asia and the Pacific Islands.

Opportunities

The role of new and effective vaccines as control measures for epidemics and as tools for elimination remains to be explored.

Additional Technical Information

For the most current updates about typhoid fever, please visit CDC Travelers' Health at **http://www.cdc.gov/travel/diseases/typhoid.htm**. Additional information on typhoid fever can be obtained from your local or state health department, a travel clinic, or your doctor. Also, CDC provides a Travelers' Hotline, at 1-888-232-3228.

MMWR Articles

- Typhoid Immunizations MMWR Recommendations and Reports / December 16, 1994: **http://www.cdc.gov/epo/mmwr/preview/mmwrhtml/00035643.htm**

Links

- CDC Safe Water System: **http://www.cdc.gov/safewater**
- CDC Travelers' Health: **http://www.cdc.gov/travel**

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More Guideline Sources

The guideline above on typhoid fever 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 typhoid fever. 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 typhoid fever. Due to space limitations these sources are listed in a concise manner. Do not hesitate to consult the following sources by either using the Internet hyperlink provided, or, in cases where the contact information is provided, contacting the publisher or author directly.

Topic Pages: MEDLINEplus

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

If you do not find topics of interest when browsing health topic pages, then you can choose to use the advanced search utility of MEDLINEplus at 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 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 "typhoid fever" or synonyms. The following was recently posted:

- **Diagnosis and management of foodborne illnesses: a primer for physicians.**

  Source: Centers for Disease Control and Prevention/American Medical Association/Food Safety and Inspection Service/Center for Food Safety and Applied Nutrition.; Reprint released 2001 January; 88 pages

  http://www.guideline.gov/FRAMESETS/guideline_fs.asp?guideline=001933&sSearch_string=typhoid+fever

Healthfinder™

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

- **Preventing Typhoid Fever: Frequently Asked Questions**

  Summary: If you are planning to travel outside the United States, you should know about typhoid fever and what steps you can take to protect yourself.

  Source: National Center for Infectious Diseases, Centers for Disease Control and Prevention

  http://www.healthfinder.gov/scripts/recordpass.asp?RecordType=0&RecordID=2951

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 typhoid fever. The drawbacks of this approach are that the information is not organized by theme and that the references are often a mix of information for professionals and patients. Nevertheless, a large number of the listed Web sites provide useful background information. We can only recommend this route, therefore, for relatively rare or specific disorders, or when using highly targeted searches. To use the NIH search utility, visit the following Web page: **http://search.nih.gov/index.html**.

Additional Web Sources

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

- AOL: **http://search.aol.com/cat.adp?id=168&layer=&from=subcats**
- drkoop.com®: **http://www.drkoop.com/conditions/ency/index.html**

- Family Village: **http://www.familyvillage.wisc.edu/specific.htm**
- Google: **http://directory.google.com/Top/Health/Conditions_and_Diseases/**
- Med Help International: **http://www.medhelp.org/HealthTopics/A.html**
- Open Directory Project: **http://dmoz.org/Health/Conditions_and_Diseases/**
- Yahoo.com: **http://dir.yahoo.com/Health/Diseases_and_Conditions/**
- WebMD®Health: **http://my.webmd.com/health_topics**

Vocabulary Builder

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

Ampicillin: Semi-synthetic derivative of penicillin that functions as an orally active broad-spectrum antibiotic. [NIH]

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]

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

Bacteria: Unicellular prokaryotic microorganisms which generally possess rigid cell walls, multiply by cell division, and exhibit three principal forms: round or coccal, rodlike or bacillary, and spiral or spirochetal. [NIH]

Cholera: An acute diarrheal disease endemic in India and Southeast Asia whose causative agent is vibrio cholerae. This condition can lead to severe dehydration in a matter of hours unless quickly treated. [NIH]

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

Ciprofloxacin: A carboxyfluoroquinoline antimicrobial agent that is effective against a wide range of microorganisms. It has been successfully and safely used in the treatment of resistant respiratory, skin, bone, joint, gastrointestinal, urinary, and genital infections. [NIH]

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

Contamination: The soiling or pollution by inferior material, as by the

introduction of organisms into a wound, or sewage into a stream. [EU]

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

Dysentery: Any of various disorders marked by inflammation of the intestines, especially of the colon, and attended by pain in the abdomen, tenesmus, and frequent stools containing blood and mucus. Causes include chemical irritants, bacteria, protozoa, or parasitic worms. [EU]

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

Epidemic: Occurring suddenly in numbers clearly in excess of normal expectancy; said especially of infectious diseases but applied also to any disease, injury, or other health-related event occurring in such outbreaks. [EU]

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

Hepatitis: Inflammation of the liver. [EU]

Immunization: The induction of immunity. [EU]

Malaise: A vague feeling of bodily discomfort. [EU]

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

Myalgia: Pain in a muscle or muscles. [EU]

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

Parenteral: Not through the alimentary canal but rather by injection through some other route, as subcutaneous, intramuscular, intraorbital, intracapsular, intraspinal, intrasternal, intravenous, etc. [EU]

Perforation: 1. the act of boring or piercing through a part. 2. a hole made through a part or substance. [EU]

Rubella: An acute, usually benign, infectious disease caused by a togavirus and most often affecting children and nonimmune young adults, in which the virus enters the respiratory tract via droplet nuclei and spreads to the lymphatic system. It is characterized by a slight cold, sore throat, and fever, followed by enlargement of the postauricular, suboccipital, and cervical lymph nodes, and the appearances of a fine pink rash that begins on the head and spreads to become generalized. Called also German measles, roetln, röteln, and three-day measles, and rubeola in French and Spanish. [EU]

Salmonella: A genus of gram-negative, facultatively anaerobic, rod-shaped bacteria that utilizes citrate as a sole carbon source. It is pathogenic for humans, causing enteric fevers, gastroenteritis, and bacteremia. Food poisoning is the most common clinical manifestation. Organisms within this genus are separated on the basis of antigenic characteristics, sugar

fermentation patterns, and bacteriophage susceptibility. [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]

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

Vaccination: The introduction of vaccine into the body for the purpose of inducing immunity. Coined originally to apply to the injection of smallpox vaccine, the term has come to mean any immunizing procedure in which vaccine is injected. [EU]

Vaccine: A suspension of attenuated or killed microorganisms (bacteria, viruses, or rickettsiae), administered for the prevention, amelioration or treatment of infectious diseases. [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 typhoid fever. 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.[9] 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 typhoid fever. The chapter ends with a discussion on how to find a doctor that is right for you.

Associations and Typhoid Fever

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.[10] 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

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

influence your well-being. This is true for both minor conditions and serious illnesses. For example, a study on female breast cancer survivors revealed that women who participated in support groups lived longer and experienced better quality of life when compared with women who did not participate. In the support group, women learned coping skills and had the opportunity to share their feelings with other women in the same situation.

There are a number of directories that list additional medical associations that you may find useful. While not all of these directories will provide different information, by consulting all of them, you will have nearly exhausted all sources for patient associations.

The National Health Information Center (NHIC)

The National Health Information Center (NHIC) offers a free referral service to help people find organizations that provide information about typhoid fever. 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 "typhoid fever" (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 "typhoid fever". 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 "typhoid fever" (or synonyms) into the "For these words:" box, you will only receive results on organizations dealing with typhoid fever. 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 "typhoid fever" (or a synonym) in the search box.

Online Support Groups

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

Finding Doctors

One of the most important aspects of your treatment will be the relationship between you and your doctor or specialist. All patients with typhoid fever 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:[11]

- 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.

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

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

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

- Check with the associations listed earlier in this chapter.
- Information on doctors in some states is available on the Internet at **http://www.docboard.org**. This Web site is run by "Administrators in Medicine," a group of state medical board directors.
- The American Board of Medical Specialties can tell you if your doctor is board certified. "Certified" means that the doctor has completed a training program in a specialty and has passed an exam, or "board," to assess his or her knowledge, skills, and experience to provide quality patient care in that specialty. Primary care doctors may also be certified as specialists. The AMBS Web site is located at **http://www.abms.org/newsearch.asp**.[12] 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.

[12] 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[13]

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 typhoid fever?
- 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 typhoid fever?
- 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[14]

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

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

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

Broader Health-Related Resources

In addition to the references above, the NIH has set up guidance Web sites that can help patients find healthcare professionals. These include:[15]

- 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

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

PART II: ADDITIONAL RESOURCES AND ADVANCED MATERIAL

ABOUT PART II

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

CHAPTER 3. STUDIES ON TYPHOID FEVER

Overview

Every year, academic studies are published on typhoid fever 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 typhoid fever. 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 typhoid fever 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 typhoid fever, 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 "typhoid fever" (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:

- **Treatment of Gastrointestinal Infections**

  Source: Current Opinion in Gastroenterology. 15(1): 90-94. January 1999.

  Contact: Available from Lippincott Williams and Wilkins Publishers. 12107 Insurance Way, Hagerstown, MD 21740. (800) 637-3030. Fax (301) 824-7390.

  Summary: This article reviews recent advances in the treatment of gastrointestinal infections. The authors note that the past year has seen the continuing spread of antimicrobial drug resistance in important gastrointestinal pathogens. Typhoid fever seen in the U.S. was multidrug resistant, but still susceptible to quinolones. The mechanism of quinolone resistant typhoid in Vietnam was better elucidated. Treatment failures in enterocateriaceae treated with quinolones suggest that the minimum inhibitory concentration breakpoint for resistance should be lowered. Evidence is mounting that ciprofloxacin and ofloxacin may be safely used to treat serious infections in children. Cefixime showed some promise in treating shigellosis in an open label trial. Decreased gastric acid secretion was associated with cholera but not dysentery. Phase 1 trials of vaccines for cholera and enterotoxigenic Escherichia coli showed promise. The antifungal drug, clotrimazole, demonstrated the ability to inhibit secretory diarrhea in laboratory studies, while nitazoxanide demonstrated efficacy in both protozoan and helminthic infections in humans, including fascioliasis. 17 references (6 annotated).

- **Health Education in Bophuthatswana**

  Source: Curationis (Pretoria). 1(4):4-7, March 1979.

  Summary: Formal health education efforts in Bophuthatswana began in 1975 with the establishment of the Department of Health and Social Welfare. The community education and immunization services division of the Department controlled educational activities concerned with family planning, dietetics, environmental hygiene, and mental hygiene, and organized a mobile health unit to assist general health programs, health needs, and health exhibitions. A 1977 survey of nine regional

hospitals indicated that (1) poor nutrition, tuberculosis, typhoid fever, diarrhea, and babies born without the aid of midwives were the most important problems; (2) little evaluation of educational programs had been implemented; (3) hospitals had access to more sophisticated materials than clinics; (4) no training was given to health education workers; and (5) more emphasis was needed on health education, particularly at the regional level. The plan developed to respond to these findings included establishing a national health education unit to develop an overall policy, initiating special community education projects, organizing refresher courses and inservice training for health workers, establishing an audiovisual center, establishing a liaison with the mass media, evaluating educational field services, and executing relevant health education research.

Federally-Funded Research on Typhoid Fever

The U.S. Government supports a variety of research studies relating to typhoid fever and associated conditions. These studies are tracked by the Office of Extramural Research at the National Institutes of Health.[16] CRISP (Computerized Retrieval of Information on Scientific Projects) is a searchable database of federally-funded biomedical research projects conducted at universities, hospitals, and other institutions. Visit the CRISP Web site at **http://commons.cit.nih.gov/crisp3/CRISP.Generate_Ticket**. You can perform targeted searches by various criteria including geography, date, as well as topics related to typhoid fever 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 typhoid fever 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 typhoid fever:

[16] 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).

- **Project Title: Conjugate Vaccines Designed to Prevent Typhoid Fever**

  Principal Investigator & Institution: Khiem, Ha B.; ; Pasteur Institute 167 Pasteur St (3Rd District) Ho Chi Minh City,

  Timing: Fiscal Year 2000; Project Start 0-SEP-1997; Project End 1-MAR-2000

  Summary: This project is for an efficacy trial (Phase 3) Of Vi -rEPA (Vi-recombinant exoprotein A of Pseudomonas aeroginosa) and S para A-TT (Salmonella paratyphi A -tetanus toxoid) investigational vaccines developed by the NICHD, NIH, Vi and S. paratyphi A conjugates will be evaluated for enteric fevers in the Dong Thap Province of Vietnam in a randomized double blinded, vaccine-controlled trial in about 16,000 children, ages 2 to 5 years. Children will be randomized to receive 2 injections, spaced 6 weeks apart, of either Vi or S. paratyphi A conjugates. The study area will include 16 communes/Town of Cao Lanh District, Done Thap Province (population of 2-5 years old about 17,000). A baseline epidemiological study showed a high incidence of typhoid fever in the study population with an incidence of blood culture confirmed typhoid fever at .43/100 / year in 2-4 years old children. Census will be conducted before recruitment of subjects. Each injection of vaccine will be completed its about 2- 3 weeks. An intensive lever surveillance and blood culture of fever cases will be carried out by all health facilities of the study communes as well as the Provincial Hospital for at least 24 months following vaccination to identify enteric fever caused by S. typhi or S. paratyphi A. This will be followed by a less intensive passive blood culture surveillance for an additional year. A subset of randomly selected children (one child each week at each commune during the entire study period) will be asked to give blood for the study of persistence of vaccine-induced antibody. Laboratory investigation and data management will be carried out at the Dong Thap Provincial Hospital. The end point for vaccine efficacy will be blood culture confirmed enteric fever.

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

- **Project Title: Epithelial Responses to Enteric Organisms**

  Principal Investigator & Institution: Neish, Andrew S.; Pathology; Emory University 1380 S Oxford Rd Atlanta, Ga 30322

  Timing: Fiscal Year 2002; Project Start 5-MAY-2002; Project End 0-APR-2006

  Summary: (provided by applicant): Bacteria are capable of establishing a wide variety of interactive relationships with eukaryotic hosts that may be symbiotic, commensal or parasitic. In humans, such parasitic

relationships result in both overt and covert disease. One site where prokaryotic- eukaryotic interactions are particularly diverse and clinically relevant is in the mammalian intestinal tract, where a vastly complex ecosystem of bacteria interfaces with an immense epithelial surface. It has become apparent that both host and microbe influence each other's physiological function to arrange a generally, though not absolutely, mutually beneficial coexistence. Clinical syndromes such as idiopathic inflammatory bowel disease may result when this mutual tolerance breaks down. Furthermore, some bacteria have evolved lifestyles that directly or indirectly elicit host responses characteristic of tissue injury, thus these organisms are generally considered pathogens. A classic example is the common Gram negative enteropathogen Salmonella. These organisms are causal of a variety of clinical syndromes, including inflammatory diarrhea, systemic typhoid fever, reactive (non-infectious) arthritis and potentially, other previously unrecognized, medically important manifestations. Recent technical developments have permitted large-scale, parallel analysis of gene expression, or "expression profiling". These methods allow genome-wide analysis of regulatory programs elicited by given stimuli. In this proposal we will employ the approach of infection/colonization with bacteria. For most of our proposed studies, we will utilize Salmonella typhimurium, for which we have characterized a spectrum of genetic and environmental variables that affect virulence. We will analyze other strains of Salmonella, both pathogenic and non-pathogenic, with the overall goal of defining a host "expression profile" of bacterial pathogenesis that will be of great utility in the study of host interactions with other pathogens. More significantly, these data will be invaluable in the recognition of these signatures in human diseases potentially associated with infection by known and unknown organisms.

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

- **Project Title: Molecular Genetic Analysis of Salmonella Pathogenicity**

  Principal Investigator & Institution: Curtiss, Roy I.; Professor; Biology; Washington University Lindell and Skinker Blvd St. Louis, Mo 63130

  Timing: Fiscal Year 2002; Project Start 1-APR-1987; Project End 1-MAY-2007

  Summary: Our long-term objective has been, and will continue to be, to better understand the mechanisms governing infection and disease by Salmonella when administered by the normal oral route of entry. We will study S. typhimurium infection of chicks to evaluate persistent intestinal colonization and mice as a model of typhoid fever in humans and will make extensive use of murine and human cells in culture. We will continue, in all our endeavors, to develop methods to identify and

analyze mechanisms for regulated expression of genes that might contribute to pathogenicity. Specifically, we will: (1) evaluate expression of S. typhimurium genes at ambient temperatures in a simulated polluted water environment with the objective to identify genes enhancing survival and potentiating successful colonization of the warm-blooded animal host and, subsequently, to characterize their functions and means of regulation, (2) define roles of adhesins in targeting Salmonella to specific cell types and tissues in the murine host, in enabling long-term colonization of the intestine and cecum in chicks, and in contributing to surface colonization (biofilm formation) in the simulated polluted water medium at ambient temperatures, and (3) continue to define mechanisms for colonization of the GALT (Peyer's patches) by identification of expressed genes with subsequent generation of mutants for characterization and complementation and to establish the means of their regulation. In these studies, we will extensively employ newly developed molecular genetic tools, such as selective capture of transcribed sequences (SCOTS), an easy and efficient method to generate mutant strains with defined deletion mutations, and selective regimens to generate operon fusions in addition to more standard means of genetic and molecular genetic manipulation. Our studies will use a broad range of methods of microbial genetics, molecular biology, biochemistry, immunology, cell biology, microscopy and animal science. All experiments will be conducted under conditions that preclude infections of workers and inadvertent release of infectious microorganisms.

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

- **Project Title: PHOP Regulon and Salmonella Virulence**

  Principal Investigator & Institution: Miller, Samuel I.; Professor; Medicine; University of Washington Seattle, Wa 98195

  Timing: Fiscal Year 2000; Project Start 1-FEB-1991; Project End 1-MAY-2001

  Summary: Salmonellae are facultative intracellular pathogens which cause significant diseases in humans and animals. These organisms cause several disease syndromes including enteric (typhoid) fever, gastroenteritis, bacteremias, and focal infections. Typhoid fever is a severe systemic illness which is mostly a problem in the developing world and in travelers. Non-typhoidal Salmonella infections are increasing in the United States and are largely associated with contaminated food. Recently several outbreaks of S. enteritis associated with contaminated intact shell eggs have been a major problem in the United States. Salmonellae infections are more severe in infants, the elderly, and in immunosuppressed individuals. This is a particular

problem for patients with AIDS, as such individuals develop severe and recurring infections. In fact recurrent Salmonella bacteremia is an AIDS defining opportunistic infection. Murine infection with S. typhimurium is an important model for studies of typhoid fever pathogenesis and vaccine development because the causative agent S. typhi only infects humans. This grant proposes to study this model system and several tissue culture models of infection, including one that models human gastroenteritis. The role of one set of bacterial virulence genes that are coordinately regulated is the focus of this grant. This system termed the PhoP/PhoQ regulon is composed of genes important to the pathogenesis of typhoid fever, and based upon an in vitro tissue culture model, gastroenteritis. A set of genes that are PhoP-activated (pag) are expressed within acidified macrophage phagosomes and promote organism survival within macrophages, which is an essential property necessary to cause typhoid fever. Another set of genes termed PhoP-repressed genes (prg) are essential to signaling eucarytotic cells to initiate cytoskeletal rearrangements that ultimately lead to organism internalization. This property is important to colonization of epithelia and is likely important to cross the intestinal mucosal barrier. prg also are involved in signaling at epithelial apical surfaces to stimulate inflammatory neutrophil transmigration across an intact monolayer. This inflammation likely contributes to diarrhea. This grant proposes to further define these virulence genes, to study in molecular detail their regulation and role in bacterial virulence.

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

E-Journals: PubMed Central[17]

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).[18] Access to this growing archive of e-journals is free and unrestricted.[19] To search, go to **http://www.pubmedcentral.nih.gov/index.html#search**, and type

[17] Adapted from the National Library of Medicine: **http://www.pubmedcentral.nih.gov/about/intro.html**.

[18] 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.

[19] 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.

"typhoid fever" (or synonyms) into the search box. This search gives you access to full-text articles. The following is a sample of items found for typhoid fever in the PubMed Central database:

- **Epidemic Typhoid in Vietnam: Molecular Typing of Multiple-Antibiotic-Resistant Salmonella enterica Serotype Typhi from Four Outbreaks** by Phillippa Connerton, John Wain, Tran T. Hien, Tahir Ali, Christopher Parry, Nguyen T. Chinh, Ha Vinh, Vo A. Ho, To S. Diep, Nicholas P. J. Day, Nicholas J. White, Gordon Dougan, and Jeremy J. Farrar; 2000 February
  http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=86238&rendertype=external
- **Molecular Typing of Multiple-Antibiotic-Resistant Salmonella enterica Serovar Typhi from Vietnam: Application to Acute and Relapse Cases of Typhoid Fever** by John Wain, Tran T. Hien, Phillippa Connerton, Tahir Ali, Christopher M. Parry, Nguyen T. T. Chinh, Ha Vinh, Cao X. T. Phuong, Vo A. Ho, To S. Diep, Jeremy J. Farrar, Nicholas J. White, and Gordon Dougan; 1999 August
  http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=85257&rendertype=external
- **Quantitation of Bacteria in Bone Marrow from Patients with Typhoid Fever: Relationship between Counts and Clinical Features** by John Wain, Phan Van Be Bay, Ha Vinh, Nguyen M. Duong, To Song Diep, Amanda L. Walsh, Christopher M. Parry, Robert P. Hasserjian, Vo Anh Ho, Tran T. Hien, Jeremy Farrar, Nicholas J. White, and Nicholas P. J. Day; 2001 April
  http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=87972&rendertype=external
- **Serology of Typhoid Fever in an Area of Endemicity and Its Relevance to Diagnosis** by Deborah House, John Wain, Vo A. Ho, To S. Diep, Nguyen T. Chinh, Phan V. Bay, Ha Vinh, Minh Duc, Christopher M. Parry, Gordon Dougan, Nicholas J. White, Tran Tinh Hien, and Jeremy J. Farrar; 2001 March
  http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=87864&rendertype=external
- **Typhoid Fever Due to Salmonella Kapemba Infection in an Otherwise Healthy Middle-Aged Man** by Hans-Eckart Sarnighausen, Claus Benz, Martin Eickenberg, J. Bockemuhl, H. Tschape, and Jurgen F. Riemann; 1999 July
  http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=85176&rendertype=external

- **Value of a Single-Tube Widal Test in Diagnosis of Typhoid Fever in Vietnam** by Christopher M. Parry, Nguyen Thi Tuyet Hoa, To Song Diep, John Wain, Nguyen Tran Chinh, Ha Vinh, Tran Tinh Hien, Nicholas J. White, and Jeremy J. Farrar; 1999 September
  http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=85403&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.[20] If the publisher has a Web site that offers full text of its journals, PubMed will provide links to that site, as well as to sites offering other related data. User registration, a subscription fee, or some other type of fee may be required to access the full text of articles in some journals.

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

- **Dr F. W. E. Hare and the cold bath treatment of typhoid fever.**
  Author(s): Thearle MJ.
  Source: Occas Pap Med Hist Aust. 1987; 3: 151-71. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11621832&dopt=Abstract

- **Phytochemical and antimicrobial properties of constituents of "Ogwu Odenigbo", a popular Nigerian herbal medicine for typhoid fever.**
  Author(s): Ebi GC, Kamalu TN.

[20] 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.

Source: Phytotherapy Research : Ptr. 2001 February; 15(1): 73-5.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11180528&dopt=Abstract

- **Typhoid fever in the park: epidemiology of an outbreak at a cultural interface.**
  Author(s): Cote TR, Convery H, Robinson D, Ries A, Barrett T, Frank L, Furlong W, Horan J, Dwyer D.
  Source: Journal of Community Health. 1995 December; 20(6): 451-8.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=8568020&dopt=Abstract

Vocabulary Builder

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

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

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

Bacteremia: The presence of viable bacteria circulating in the blood. Fever, chills, tachycardia, and tachypnea are common acute manifestations of bacteremia. The majority of cases are seen in already hospitalized patients, most of whom have underlying diseases or procedures which render their bloodstreams susceptible to invasion. [NIH]

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

Cefixime: A third-generation cephalosporin antibiotic that is stable to hydrolysis by beta-lactamases. [NIH]

Clotrimazole: An imidazole derivative with a broad spectrum of antimycotic activity. It inhibits biosynthesis of the sterol ergostol, 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]

Cytotoxic: Pertaining to or exhibiting cytotoxicity. [EU]

Dietetics: The study and regulation of the diet. [NIH]

Enterocolitis: Inflammation involving both the small intestine and the colon; see also enteritis. [EU]

Epidemiological: Relating to, or involving epidemiology. [EU]

Escherichia: A genus of gram-negative, facultatively anaerobic, rod-shaped bacteria whose organisms occur in the lower part of the intestine of warm-blooded animals. The species are either nonpathogenic or opportunistic pathogens. [NIH]

Fascioliasis: Helminth infection of the liver caused by species of Fasciola. [NIH]

Gastroenteritis: An acute inflammation of the lining of the stomach and intestines, characterized by anorexia, nausea, diarrhoea, abdominal pain, and weakness, which has various causes, including food poisoning due to infection with such organisms as Escherichia coli, Staphylococcus aureus, and Salmonella species; consumption of irritating food or drink; or psychological factors such as anger, stress, and fear. Called also enterogastritis. [EU]

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

Idiopathic: Of the nature of an idiopathy; self-originated; of unknown causation. [EU]

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]

Microorganism: A microscopic organism; those of medical interest include bacteria, viruses, fungi and protozoa. [EU]

Microscopy: The application of microscope magnification to the study of materials that cannot be properly seen by the unaided eye. [NIH]

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

Neutrophil: Having an affinity for neutral dyes. [EU]

Operon: The genetic unit consisting of a feedback system under the control of an operator gene, in which a structural gene transcribes its message in the form of mRNA upon blockade of a repressor produced by a regulator gene. Included here is the attenuator site of bacterial operons where transcription termination is regulated. [NIH]

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

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

Pathogen: Any disease-producing microorganism. [EU]

Phagosomes: Membrane-bound cytoplasmic vesicles formed by invagination of phagocytized material. They fuse with lysosomes to form phagolysosomes in which the hydrolytic enzymes of the lysosome digest the phagocytized material. [NIH]

Protozoan: 1. any individual of the protozoa; protozoon. 2. of or pertaining to the protozoa; protozoal. [EU]

Pseudomonas: A genus of gram-negative, aerobic, rod-shaped bacteria widely distributed in nature. Some species are pathogenic for humans, animals, and plants. [NIH]

Recombinant: 1. a cell or an individual with a new combination of genes not found together in either parent; usually applied to linked genes. [EU]

Regulon: In eukaryotes, a genetic unit consisting of a noncontiguous group of genes under the control of a single regulator gene. In bacteria, regulons are global regulatory systems involved in the interplay of pleiotropic regulatory domains. These regulatory systems consist of several operons. [NIH]

Secretion: 1. the process of elaborating a specific product as a result of the activity of a gland; this activity may range from separating a specific substance of the blood to the elaboration of a new chemical substance. 2. any substance produced by secretion. [EU]

Spectrum: A charted band of wavelengths of electromagnetic vibrations obtained by refraction and diffraction. By extension, a measurable range of activity, such as the range of bacteria affected by an antibiotic (antibacterial s.) or the complete range of manifestations of a disease. [EU]

Synergistic: Acting together; enhancing the effect of another force or agent. [EU]

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

Tetanus: A disease caused by tetanospasmin, a powerful protein toxin

produced by clostridium tetani. Tetanus usually occurs after an acute injury, such as a puncture wound or laceration. Generalized tetanus, the most common form, is characterized by tetanic muscular contractions and hyperreflexia. Localized tetanus presents itself as a mild condition with manifestations restricted to muscles near the wound. It may progress to the generalized form. [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]

Tuberculosis: Any of the infectious diseases of man and other animals caused by species of mycobacterium. [NIH]

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]

CHAPTER 4. PATENTS ON TYPHOID FEVER

Overview

You can learn about innovations relating to typhoid fever by reading recent patents and patent applications. Patents can be physical innovations (e.g. chemicals, pharmaceuticals, medical equipment) or processes (e.g. treatments or diagnostic procedures). The United States Patent and Trademark Office defines a patent as a grant of a property right to the inventor, issued by the Patent and Trademark Office.[21] Patents, therefore, are intellectual property. For the United States, the term of a new patent is 20 years from the date when the patent application was filed. If the inventor wishes to receive economic benefits, it is likely that the invention will become commercially available to patients with typhoid fever within 20 years of the initial filing. It is important to understand, therefore, that an inventor's patent does not indicate that a product or service is or will be commercially available to patients with typhoid fever. The patent implies only that the inventor has "the right to exclude others from making, using, offering for sale, or selling" the invention in the United States. While this relates to U.S. patents, similar rules govern foreign patents.

In this chapter, we show you how to locate information on patents and their inventors. If you find a patent that is particularly interesting to you, contact the inventor or the assignee for further information.

[21]Adapted from The U. S. Patent and Trademark Office:
http://www.uspto.gov/web/offices/pac/doc/general/whatis.htm.

Patents on Typhoid Fever

By performing a patent search focusing on typhoid fever, you can obtain information such as the title of the invention, the names of the inventor(s), the assignee(s) or the company that owns or controls the patent, a short abstract that summarizes the patent, and a few excerpts from the description of the patent. The abstract of a patent tends to be more technical in nature, while the description is often written for the public. Full patent descriptions contain much more information than is presented here (e.g. claims, references, figures, diagrams, etc.). We will tell you how to obtain this information later in the chapter. The following is an example of the type of information that you can expect to obtain from a patent search on typhoid fever:

- **Nucleic acid probe and method for the rapid detection of typhoid fever bacteria**

  Inventor(s): Kopecko; Dennis J. (Rockville, MD), Barson; Louis S. (Silver Spring, MD), Rubin; Fran A. (Bethesda, MD)

  Assignee(s): The United States of America as represented by the Secretary of the Army (Washington, DC)

  Patent Number: 5,055,394

  Date filed: June 23, 1986

  Abstract: This invention relates to a nucleic acid probe and method for the rapid detection of typhoid fever bacteria by use of a nucleic acid hybridization probe, equivalent to the DNA region encoding the Vi antigen of enteric bacteria such as Salmonella typhi, S. paratyphi C, or Citrobacter freundii, in a nucleic acid hybridization reaction with a clinical specimen containing typhoid fever bacteria.

  Excerpt(s): This invention relates to a unique nucleic acid hybridization probe and method for the rapid detection of typhoid fever bacteria. ... Diarrheal diseases caused by enteric bacteria are still a major cause of illness and death worldwide, especially among infants and young children in developing nations. Also, these maladies are an important military problem in deployed soldiers. Although the incidence of diarrheal disease is highest in tropical countries, geography is not as important a factor as socioeconomic conditions; e.g. as manifested by drinking water purity, sewage disposal methods, and the availability of balanced diets. Some enteric diseases are short-lived, self-limiting and result in a mild gastroenteritis (e.g. certain Salmonella serotypes). In contrast, typhoid fever, caused by Salmonella typhi, is a prolonged,

generalized, and usually serious infection of humans of all age groups. Similar enteric diseases are caused by related bacteria such as Salmonella paratyphi A, B, and C and by other Salmonella serotypes. ... This invention is directed to a method for the rapid detection of typhoid fever bacteria by use of a unique nucleic acid hybridization probe, equivalent to the DNA region encoding the Vi antigen of enteric bacteria such as Salmonella typhi, Salmonella paratyphi C, or Citrobacter freundii, in a nucleic acid hybridization reaction with a clinical specimen containing typhoid fever bacteria.

Web site: http://www.delphion.com/details?pn=US05055394__

Patent Applications on Typhoid Fever

As of December 2000, U.S. patent applications are open to public viewing.[22] Applications are patent requests which have yet to be granted (the process to achieve a patent can take several years).

Keeping Current

In order to stay informed about patents and patent applications dealing with typhoid fever, you can access the U.S. Patent Office archive via the Internet at no cost to you. This archive is available at the following Web address: **http://www.uspto.gov/main/patents.htm**. Under "Services," click on "Search Patents." You will see two broad options: (1) Patent Grants, and (2) Patent Applications. To see a list of granted patents, perform the following steps: Under "Patent Grants," click "Quick Search." Then, type "typhoid fever" (or synonyms) into the "Term 1" box. After clicking on the search button, scroll down to see the various patents which have been granted to date on typhoid fever. You can also use this procedure to view pending patent applications concerning typhoid fever. Simply go back to the following Web address: **http://www.uspto.gov/main/patents.htm**. Under "Services," click on "Search Patents." Select "Quick Search" under "Patent Applications." Then proceed with the steps listed above.

Vocabulary Builder

Citrobacter: A genus of gram-negative, rod-shaped enterobacteria that can

[22] This has been a common practice outside the United States prior to December 2000.

use citrate as the sole source of carbon. [NIH]

Conjugated: Acting or operating as if joined; simultaneous. [EU]

Hybridization: The genetic process of crossbreeding to produce a hybrid. Hybrid nucleic acids can be formed by Nucleic Acid Hybridization of DNA and RNA molecules. Protein Hybridization allows for hybrid proteins to be formed from polypeptide chains. [NIH]

Immunogenic: Producing immunity; evoking an immune response. [EU]

CHAPTER 5. BOOKS ON TYPHOID FEVER

Overview

This chapter provides bibliographic book references relating to typhoid fever. You have many options to locate books on typhoid fever. The simplest method is to go to your local bookseller and inquire about titles that they have in stock or can special order for you. Some patients, however, feel uncomfortable approaching their local booksellers and prefer online sources (e.g. **www.amazon.com** and **www.bn.com**). In addition to online booksellers, excellent sources for book titles on typhoid fever 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.

Book Summaries: Federal Agencies

The Combined Health Information Database collects various book abstracts from a variety of healthcare institutions and federal agencies. To access these summaries, go directly to the following hyperlink: **http://chid.nih.gov/detail/detail.html**. You will need to use the "Detailed Search" option. To find book summaries, 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. For the format option, select "Monograph/Book." Now type "typhoid fever" (or synonyms) into the "For these words:" box. You will only receive results on books. You should check back periodically with this database which is updated every 3 months. The following is a typical result when searching for books on typhoid fever:

- **Oral and Cutaneous Manifestations of Hematogenously Disseminated Systemic Infections: A Monograph**

  Source: Research Triangle Park, NC: Glaxo, Inc. 1993. 79 p.

  Contact: Available from Glaxo-Wellcome Education Resource Center. 5 Moore Drive, Research Triangle Park, NC 27709. (800) 824-2896. PRICE: Single copy free. Stock Number GVL251.

  Summary: This monograph describes oral and dermatologic manifestations resulting from systemic infections. Written as a continuing education tool for physicians, the monograph features 26 sections, each of which includes a description of dermatologic manifestations, other clinical features, laboratory findings, and epidemiologic factors. Diseases covered include AIDS, blastomycosis, candidiasis, coccidioidomycosis, cryptococcoses, erythema infectiousum (Fifth disease), gonococcemia, gram-negative bacterial sepsis, hand-foot-and-mouth disease, infectious mononucleosis, infective endocarditis, Kawasaki syndrome, leprosy, lyme disease, meningococcemia, Rocky Mountain spotted fever, roseola, rubella (German measles), rubeola (measles), scarlet fever, secondary (disseminated) syphilis, staphylococcal scalded skin syndrome, toxic shock syndrome, typhoid fever, varicella (chickenpox), and Vibrio vulnificus infection. Each section is illustrated with full-color photographs depicting patients with manifestations of the disease under consideration. The monograph includes a glossary of illustrations to help with diagnosis and classification. The monograph concludes with a self-test and instructions for receiving continuing medical education credits. A subject index is also included. 12 references.

Book Summaries: Online Booksellers

Commercial Internet-based booksellers, such as Amazon.com and Barnes & Noble.com, offer summaries which have been supplied by each title's publisher. Some summaries also include customer reviews. Your local bookseller may have access to in-house and commercial databases that index all published books (e.g. Books in Print®). The following have been recently listed with online booksellers as relating to typhoid fever (sorted alphabetically by title; follow the hyperlink to view more details at Amazon.com):

- **Disease in the Popular American Press: The Case of Diphtheria, Typhoid Fever, and Syphilis, 1870-1920 (Contributions in Medical Studies)** by Terra Diane Ziporyn (1988); ISBN: 0313260354;

http://www.amazon.com/exec/obidos/ASIN/0313260354/icongroupinterna

- **Typhoid Fever (Epidemics)** by Kurt Ray; ISBN: 0823935728; http://www.amazon.com/exec/obidos/ASIN/0823935728/icongroupinterna
- **Typhoid Fever: Its Nature, Mode of Spreading and Prevention (Public Health in America Series)** by William Budd (1977); ISBN: 040509809X; http://www.amazon.com/exec/obidos/ASIN/040509809X/icongroupinterna
- **Typhoid Fever: Strategies for the 90's: Selected Papers from the First Asia-Pacific Symposium on Typhoid Fever** by Malaysia) Asia-Pacific Symposium on Typhoid Fever 1991 Kuala Lumpur (1992); ISBN: 9810209533; http://www.amazon.com/exec/obidos/ASIN/9810209533/icongroupinterna
- **Typhoid Mary: An Urban Historical** by Anthony Bourdain (2001); ISBN: 1582341338; http://www.amazon.com/exec/obidos/ASIN/1582341338/icongroupinterna
- **Typhoid Mary: Captive to the Public's Health** by Judith Walzer Leavitt; ISBN: 0807021032; http://www.amazon.com/exec/obidos/ASIN/0807021032/icongroupinterna

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 "typhoid fever" (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:[23]

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

- **1936 outbreak of typhoid fever at Poole, Bournemouth and Christchurch, with special reference to clinical features and to treatment of patient and disease, by S. Watson Smith ...** Author: Smith, Sydney Watson; Year: 1942; [Bournemouth, Pardy & son, ltd.] 1942
- **Disease in the popular American press: the case of diphtheria, typhoid fever, and syphilis, 1870-1920.** Author: Terra Ziporyn; Year: 1988; New York: Greenwood Press, 1988; ISBN: 0313260354 (lib. bdg.: alk. paper) http://www.amazon.com/exec/obidos/ASIN/0313260354/icongroupinterna
- **Epidemic of typhoid fever due to ice-cream.** Author: by R. Green and D.S. Mankikar; Year: 1950; Kuala Lumpur: Government Press, 1950
- **History of the intestinal infections [microform]: (and typhus fever) in Australia 1788-1923.** Author: by J.H.L. Cumpston and F. McCallum; Year: 1927; Melbourne : H.J. Green, 1927
- **Max von Pettenkofer, his theory of the etiology of cholera, typhoid fever & other intestinal diseases, a review of his arguments and evidence, by Edgar Erskine Hume ... with 8 full-page plates.** Author: Hume, Edgar Erskine, 1889-; Year: 1927; New York, P. B. Hoeber inc., 1927
- **Morbid anatomy of the brain, in typhous or brain-fever [microform]: to which are added casses of the present epidemic: with a few remarks on its nature and mode of treatment.** Author: by Thomas Mills; Year: 1818; Dublin: Hodges and M'Arthur; London: Messrs. Underwood, 1818
- **Novel view of the causes producing typhoid fever, &c., and plan of treatment.** Author: by John Morton; Year: 1875; Sydney: J. Sands, 1875
- **Papers on typhoid fever in the British Empire.** Author: Budd, William, 1811-1880; Year: 1882; [v. p.] 1882-1912
- **Report of investigations of the typhoid fever epidemic, Minneapolis, 1935.** Author: Minnesota. Dept. of Health; Year: 1936; [Minneapolis, 1936?]
- **Report on a typhoid fever epidemic at Manteno state hospital in 1939. Prepared largely from the unpublished reports and findings of Carl E. Schwob and C. Milton Eberhart ...** Author: Illinois. Dept. of Public Health; Year: 1945; [Springfield? Ill.] 1945
- **Report on the prevalence of typhoid fever in York, during the year 1884.** Author: by S.W. North ...: presented to the Urban Sanitary Authority, February 17th, 1885; Year: 1885; York: Printed by Ben Johnson and Company ..., 1885

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.**

- **Report upon the epidemic of typhoid fever, at Plymouth, Pa.: read by appointment before the Luzerne County Medical Society of Wilkes-Barre, Pa., May 21st, 1885, and before the State Medical Society of Pennsylvania, at Scranton, Pa., May 29th, 1885.** Author: by L; Year: 1885; Wilkes-Barre, Pa.: E.B. Yordy, 1885
- **Special report on an outbreak of typhoid fever in the borough of Bethnal Green in 1924.** Author: by Geoffrey Eugene Oates; Year: 1925; London: Printed by order of the Public Health Committee of the Bethnal Green Borough Council, [1925]
- **To live poor but healthy: typhoid and the politics of public health in Boston, 1880-1920: a thesis.** Author: presented by Gerard Fergerson; Year: 1994; c1994
- **Typhoid and the politics of public health in nineteenth-century Philadelphia.** Author: Michael P. McCarthy; Year: 1987; Philadelphia: American Philosophical Society, 1987; ISBN: 0871691795 http://www.amazon.com/exec/obidos/ASIN/0871691795/icongroupinterna
- **Typhoid fever: its cause and prevention: illustrated by the recent epidemics in Crosshill and Eaglesham.** Author: by Eben. Duncan; Year: 1875; Glasgow: J. Maclehose, 1875
- **Typhoid fever: its nature, mode of spreading, and prevention.** Author: William Budd; Year: 1931; New York: Arno Press, 1977; ISBN: 040509809X http://www.amazon.com/exec/obidos/ASIN/040509809X/icongroupinterna
- **Typhoid fever and other salmonella infections.** Author: Huckstep, R. L. (Ronald Lawrie); Year: 1962; Edinburgh, Livingstone, 1962
- **Typhoid fever and other salmonellosis.** Author: edited by Jonathan T. Ou (editor-in chief), Cheng-Hsun Chiu, Chishih Chu; Year: 2001; Taipei, Taiwan: Jeou-Chou Book Co., c2001; ISBN: 9578324502
- **Typhoid fever eradication, 1934. [By Filip C. Forsbeck].** Author: Michigan. Dept. of Health; Year: 1935; Lansing [1935?]
- **Typhoid Mary: an urban historical.** Author: by Anthony Bourdain; Year: 2001; New York: Bloomsbury: Distributed to the trade by St. Martin's Press, c2001; ISBN: 1582341338 http://www.amazon.com/exec/obidos/ASIN/1582341338/icongroupinterna
- **Typhoid Mary: captive to the public's health.** Author: Judith Walzer Leavitt; Year: 1996; Boston: Beacon Press, c1996; ISBN: 0807021024 (alk. paper)

http://www.amazon.com/exec/obidos/ASIN/0807021024/icongroupinterna

Chapters on Typhoid Fever

Frequently, typhoid fever will be discussed within a book, perhaps within a specific chapter. In order to find chapters that are specifically dealing with typhoid fever, an excellent source of abstracts is the Combined Health Information Database. You will need to limit your search to book chapters and typhoid fever 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 "typhoid fever" (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 typhoid fever:

- **Socioeconomic, Ethnic and Geographical Health Issues**

  Source: in Scully, C. and Cawson, R.A. Medical Problems in Dentistry. 4th ed. Woburn, MA: Butterworth-Heinemann. 1998. p. 529-547.

  Contact: Available from Butterworth-Heinemann. 225 Wildwood Avenue, Woburn, MA 01801-2041. (800) 366-2665 or (781) 904-2500. Fax (800) 446-6520 or (781) 933-6333. E-mail: orders@bhusa.com. Website: www.bh.com. PRICE: $110.00. ISBN: 0723610568.

  Summary: This chapter on socioeconomic, ethnic, and geographical health issues is from a text that covers the general medical and surgical conditions relevant to the oral health care sciences. The authors discuss mainly the relevant imported diseases, problems related to social deprivation, and those which religious or ethnic groups may present during oral health care. Topics include infections, including typhoid, paratyphoid, cholera, nonvenereal treponematoses, yaws (framboesia), granuloma inguinale (donovanosis), lymphogranuloma vereneum, blood-borne viruses, arboviruses, arenaviruses, rhabdoviruses (Ebola, rabies), systemic mycoses, Aspergillosis, blastomycosis, coccidioidomycosis, cryptococcosis, histoplasmosis, mucormycosis, rhinosporidiosis, sporotrichosis, systemic candidosis, parasitic infestations, scabies, lice, fleas, malaria, toxoplasmosis, leishmaniasis, trichinosis, echinococcosis, cysticercosis, myiasis, larva migrans, filariasis, trichuriasis, gnathostomiasis, and oral submucous fibrosis. For each condition, the authors discuss general aspects, diagnosis and

management issues, dental aspects, and patient care strategies. The chapter includes a summary of the points covered. 9 tables. 45 references.

- **Routes of Transmission of Pathogenic Microorganisms**

  Source: in Joneja, J.M. and Bielory, L. Understanding Allergy, Sensitivity, and Immunity: A Comprehensive Guide. New Brunswick, NJ: Rutgers University Press. 1990. p. 20-25.

  Contact: Available from Rutgers University Press. 109 Church Street, New Brunswick, NJ 08901. (201) 932-7037. PRICE: $35 (cloth) or $13.95 (paperback). ISBN: 0813515203 (cloth) or 0813515211 (paperback).

  Summary: This chapter, from a comprehensive guide to understanding allergy, sensitivity, and immunity, discusses the routes of transmission of pathogenic microorganisms, notably the digestive route. Microorganisms in food, water, and other beverages are introduced into the digestive tract during eating and drinking. They may cause infections of the alimentary system alone or in other organ systems after dissemination from the initial infection site. Cholera, typhoid fever, and shigellosis are intestinal infections caused by bacteria that can be transmitted in contaminated water supplies. Hepatitis A virus can be transmitted in the same manner. Escherichia coli, a normal inhabitant of the healthy intestinal tract, but which can cause gastroenteritis, is commonly present in water contaminated with feces. The authors also discuss the variety of ways that food can be contaminated.

General Home References

In addition to references for typhoid fever, 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: Todays 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

Alimentary: Pertaining to food or nutritive material, or to the organs of digestion. [EU]

Aspergillosis: Infections with fungi of the genus aspergillus. [NIH]

Bacterial Infections: Infections by bacteria, general or unspecified. [NIH]

Blastomycosis: A fungal infection that may appear in two forms: 1) a primary lesion characterized by the formation of a small cutaneous nodule and small nodules along the lymphatics that may heal within several months; and 2) chronic granulomatous lesions characterized by thick crusts, warty growths, and unusual vascularity and infection in the middle or upper lobes of the lung. [NIH]

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]

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

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

Deprivation: Loss or absence of parts, organs, powers, or things that are

needed. [EU]

Diphtheria: A localized infection of mucous membranes or skin caused by toxigenic strains of corynebacterium diphtheriae. It is characterized by the presence of a pseudomembrane at the site of infection. Diphtheria Toxin, produced by C. diphtheriae, can cause myocarditis, polyneuritis, and other systemic toxic effects. [NIH]

Echinococcosis: An infection caused by the infestation of the larval form of tapeworms of the genus Echinococcus. The liver, lungs, and kidney are the most common areas of infestation. [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]

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]

Fibrosis: The formation of fibrous tissue; fibroid or fibrous degeneration [EU]

Filariasis: Infections with nematodes of the superfamily FILARIOIDEA. The presence of living worms in the body is mainly asymptomatic but the death of adult worms leads to granulomatous inflammation and permanent fibrosis. Organisms of the genus Elaeophora infect wild elk and domestic sheep causing ischaemic necrosis of the brain, blindness, and dermatosis of the face. [NIH]

Fleas: Parasitic, blood-sucking, wingless insects comprising the order Siphonaptera. [NIH]

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

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]

Larva: Wormlike or grublike stage, following the egg in the life cycle of insects, worms, and other metamorphosing animals. [NIH]

Leprosy: A chronic granulomatous infection caused by mycobacterium leprae. The granulomatous lesions are manifested in the skin, the mucous membranes, and the peripheral nerves. Two polar or principal types are lepromatous and tuberculoid. [NIH]

Mononucleosis: The presence of an abnormally large number of mononuclear leucocytes (monocytes) in the blood. The term is often used alone to refer to infectious mononucleosis. [EU]

Myiasis: The invasion of living tissues of man and other mammals by dipterous larvae. [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]

Sporotrichosis: The commonest and least serious of the deep mycoses, characterized by nodular lesions of the cutaneous and subcutaneous tissues. It is caused by inhalation of contaminated dust or by infection of a wound. [NIH]

Syphilis: A contagious venereal disease caused by the spirochete treponema pallidum. [NIH]

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]

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

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

Varicella: Chicken pox. [EU]

Vibrio: A genus of vibrionaceae, made up of short, slightly curved, motile, gram-negative rods. Various species produce cholera and other gastrointestinal disorders as well as abortion in sheep and cattle. [NIH]

Viruses: Minute infectious agents whose genomes are composed of DNA or RNA, but not both. They are characterized by a lack of independent metabolism and the inability to replicate outside living host cells. [NIH]

Yaws: A systemic non-venereal infection of the tropics caused by Treponema pallidum subspecies pertenue. [NIH]

CHAPTER 6. MULTIMEDIA ON TYPHOID FEVER

Overview

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

Bibliography: Multimedia on Typhoid Fever

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

- **Immunization against infectious diseases.** Source: produced with the support of Lederle Laboratories Division, American Cyanamid Company; originally prepared by the Department of Pediatrics and Communicable Diseases, University of Michigan Medic; Year: 1966; Format: Motion picture; United States: Fordel Films, [1966?]

- **Typhoid Mary .** Year: 1997; Format: Videorecording; [Bethesda, Md.: National Library of Medicine, 1997]
- **Typhoid vaccine research.** Source: [presented by] the United States Army; Year: 1949; Format: Motion picture; United States: War Office, 1949
- **Typhoid.** Source: presented by Trainex Corporation; Year: 1980; Format: Filmstrip; Garden Grove, Calif.: Trainex, c1980

Vocabulary Builder

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

Rhinitis: Inflammation of the mucous membrane of the nose. [EU]

Transfusion: The introduction of whole blood or blood component directly into the blood stream. [EU]

CHAPTER 7. 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.[24] 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:[25]

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

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

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

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

While all of the above references may be of interest to physicians who study and treat typhoid fever, 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 typhoid fever 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 "typhoid fever" (or synonyms) into the

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

- **Travel to Developing Countries**

  Source: New York, NY: Nidus Information Services, Inc. 1996. 8 p.

  Contact: Available from Nidus Information Services, Inc. 175 Fifth Avenue, Suite 2338, New York, NY 10010. (800) 334-9355 or (212) 260-4268. Fax (212) 529-2349. E-mail: nidus@panix.com. PRICE: $5.95; discounts available for orders of 15 or more reports.

  Summary: This health report provides advice for travelers planning to visit developing countries. Topics include general health precautions; general guidelines for immunizations; health insurance considerations; precautions for specific travel situations, including motion sickness, air travel, cruise ships, high altitude, and below sea level (scuba diving); and health problems that may concern the traveler to developing countries, including traveler's diarrhea, malaria, cholera, yellow fever, typhoid fever, hepatitis, rabies, poliomyelitis, measles, meningococcal disease, Japanese B encephalitis, insect-and other vector-borne disease, diptheria, plague, and AIDS. The report describes each disease and gives recommendations for prevention, including immunization where appropriate. The report concludes with a section describing how travelers with special health problems such as diabetes, cardiac or pulmonary disease, or pregnancy, should protect themselves. A list of information resource organizations is appended.

The NLM Gateway[26]

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.[27] 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,

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

[27] 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.[28] To use the NLM Gateway, simply go to the search site at **http://gateway.nlm.nih.gov/gw/Cmd**. Type "typhoid fever" (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	344525
Books / Periodicals / Audio Visual	2564
Consumer Health	292
Meeting Abstracts	3093
Other Collections	100
Total	350574

HSTAT[29]

HSTAT is a free, Web-based resource that provides access to full-text documents used in healthcare decision-making.[30] 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.[31] Simply search by "typhoid fever" (or synonyms) at the following Web site: **http://text.nlm.nih.gov**.

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[28] 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.

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

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

[31] 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

Coffee Break: Tutorials for Biologists[32]

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.[33] 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.[34] 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/cliniweb/**.
- **Image Engine:** Multimedia electronic medical record system that integrates a wide range of digitized clinical images with textual data stored in the University of Pittsburgh Medical Center's MARS electronic medical record system; see the following Web site: **http://www.cml.upmc.edu/cml/imageengine/imageEngine.html**.

(SAMHSA/CSAP) Prevention Enhancement Protocols System (PEPS); the Public Health Service (PHS) Preventive Services Task Force's *Guide to Clinical Preventive Services*; the independent, nonfederal Task Force on Community Services *Guide to Community Preventive Services*; and the Health Technology Advisory Committee (HTAC) of the Minnesota Health Care Commission (MHCC) health technology evaluations.

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

[33] 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.

[34] 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.

- **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**.

The Genome Project and Typhoid Fever

With all the discussion in the press about the Human Genome Project, it is only natural that physicians, researchers, and patients want to know about how human genes relate to typhoid fever. In the following section, we will discuss databases and references used by physicians and scientists who work in this area.

Online Mendelian Inheritance in Man (OMIM)

The Online Mendelian Inheritance in Man (OMIM) database is a catalog of human genes and genetic disorders authored and edited by Dr. Victor A. McKusick and his colleagues at Johns Hopkins and elsewhere. OMIM was developed for the World Wide Web by the National Center for Biotechnology Information (NCBI).[35] The database contains textual information, pictures, and reference information. It also contains copious links to NCBI's Entrez database of MEDLINE articles and sequence information.

To search the database, go to **http://www.ncbi.nlm.nih.gov/Omim/searchomim.html**. Type "typhoid fever" (or synonyms) in the search box, and click "Submit Search." If too many results appear, you can narrow the search by adding the word

[35] Adapted from **http://www.ncbi.nlm.nih.gov/**. Established in 1988 as a national resource for molecular biology information, NCBI creates public databases, conducts research in computational biology, develops software tools for analyzing genome data, and disseminates biomedical information--all for the better understanding of molecular processes affecting human health and disease.

"clinical." Each report will have additional links to related research and databases. By following these links, especially the link titled "Database Links," you will be exposed to numerous specialized databases that are largely used by the scientific community. These databases are overly technical and seldom used by the general public, but offer an abundance of information.

Genes and Disease (NCBI - Map)

The Genes and Disease database is produced by the National Center for Biotechnology Information of the National Library of Medicine at the National Institutes of Health. This Web site categorizes each disorder by the system of the body associated with it. Go to **http://www.ncbi.nlm.nih.gov/disease/**, and browse the system pages to have a full view of important conditions linked to human genes. Since this site is regularly updated, you may wish to re-visit it from time to time. The following systems and associated disorders are addressed:

- **Immune System:** Fights invaders.
  Examples: Asthma, autoimmune polyglandular syndrome, Crohn's disease, DiGeorge syndrome, familial Mediterranean fever, immunodeficiency with Hyper-IgM, severe combined immunodeficiency.
  Web site: **http://www.ncbi.nlm.nih.gov/disease/Immune.html**
- **Nervous System:** Mind and body.
  Examples: Alzheimer disease, Amyotrophic lateral sclerosis, Angelman syndrome, Charcot-Marie-Tooth disease, epilepsy, essential tremor, Fragile X syndrome, Friedreich's ataxia, Huntington disease, Niemann-Pick disease, Parkinson disease, Prader-Willi syndrome, Rett syndrome, Spinocerebellar atrophy, Williams syndrome.
  Web site: **http://www.ncbi.nlm.nih.gov/disease/Brain.html**
- **Signals:** Cellular messages.
  Examples: Ataxia telangiectasia, Baldness, Cockayne syndrome, Glaucoma, SRY: sex determination, Tuberous sclerosis, Waardenburg syndrome, Werner syndrome.
  Web site: **http://www.ncbi.nlm.nih.gov/disease/Signals.html**
- **Transporters:** Pumps and channels.
  Examples: Cystic Fibrosis, deafness, diastrophic dysplasia, Hemophilia A, long-QT syndrome, Menkes syndrome, Pendred syndrome, polycystic kidney disease, sickle cell anemia, Wilson's disease, Zellweger syndrome.
  Web site: **http://www.ncbi.nlm.nih.gov/disease/Transporters.html**

Entrez

Entrez is a search and retrieval system that integrates several linked databases at the National Center for Biotechnology Information (NCBI). These databases include nucleotide sequences, protein sequences, macromolecular structures, whole genomes, and MEDLINE through PubMed. Entrez provides access to the following databases:

- **PubMed:** Biomedical literature (PubMed),
  Web site: **http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=PubMed**
- **Nucleotide Sequence Database (Genbank):**
  Web site:
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=Nucleotide
- **Protein Sequence Database:**
  Web site: **http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=Protein**
- **Structure:** Three-dimensional macromolecular structures,
  Web site: **http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=Structure**
- **Genome:** Complete genome assemblies,
  Web site: **http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=Genome**
- **PopSet:** Population study data sets,
  Web site: **http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=Popset**
- **OMIM:** Online Mendelian Inheritance in Man,
  Web site: **http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=OMIM**
- **Taxonomy:** Organisms in GenBank,
  Web site:
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=Taxonomy
- **Books:** Online books,
  Web site: **http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=books**
- **ProbeSet:** Gene Expression Omnibus (GEO),
  Web site: **http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=geo**
- **3D Domains:** Domains from Entrez Structure,
  Web site: **http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=geo**
- **NCBI's Protein Sequence Information Survey Results:**
  Web site: **http://www.ncbi.nlm.nih.gov/About/proteinsurvey/**

To access the Entrez system at the National Center for Biotechnology Information, go to **http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?CMD=search&DB=genome**, and then select the database that you would like to search. The databases

available are listed in the drop box next to "Search." In the box next to "for," enter "typhoid fever" (or synonyms) and click "Go."

Jablonski's Multiple Congenital Anomaly/Mental Retardation (MCA/MR) Syndromes Database[36]

This online resource can be quite useful. It has been developed to facilitate the identification and differentiation of syndromic entities. Special attention is given to the type of information that is usually limited or completely omitted in existing reference sources due to space limitations of the printed form.

At the following Web site you can also search using an alphabetical index: **http://www.nlm.nih.gov/mesh/jablonski/syndrome_toc/toc_a.html.** You can search by keywords at this Web site: **http://www.nlm.nih.gov/mesh/jablonski/syndrome_db.html**.

The Genome Database[37]

Established at Johns Hopkins University in Baltimore, Maryland in 1990, the Genome Database (GDB) is the official central repository for genomic mapping data resulting from the Human Genome Initiative. In the spring of 1999, the Bioinformatics Supercomputing Centre (BiSC) at the Hospital for Sick Children in Toronto, Ontario assumed the management of GDB. The Human Genome Initiative is a worldwide research effort focusing on structural analysis of human DNA to determine the location and sequence of the estimated 100,000 human genes. In support of this project, GDB stores and curates data generated by researchers worldwide who are engaged in the mapping effort of the Human Genome Project (HGP). GDB's mission is to provide scientists with an encyclopedia of the human genome which is continually revised and updated to reflect the current state of scientific knowledge. Although GDB has historically focused on gene mapping, its focus will broaden as the Genome Project moves from mapping to sequence, and finally, to functional analysis.

To access the GDB, simply go to the following hyperlink: **http://www.gdb.org/**. Search "All Biological Data" by "Keyword." Type

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[36] Adapted from the National Library of Medicine: **http://www.nlm.nih.gov/mesh/jablonski/about_syndrome.html**.

[37] Adapted from the Genome Database: **http://gdbwww.gdb.org/gdb/aboutGDB.html#mission**.

"typhoid fever" (or synonyms) into the search box, and review the results. If more than one word is used in the search box, then separate each one with the word "and" or "or" (using "or" might be useful when using synonyms). This database is extremely technical as it was created for specialists. The articles are the results which are the most accessible to non-professionals and often listed under the heading "Citations." The contact names are also accessible to non-professionals.

Specialized References

The following books are specialized references written for professionals interested in typhoid fever (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/icongroupinterna**
- **Hunter's Tropical Medicine and Emerging Infectious Diseases** by George W. Hunter (Editor), et al; Hardcover - 1192 pages, 8th edition (January 15, 2000), W B Saunders Co; ISBN: 0721662234; **http://www.amazon.com/exec/obidos/ASIN/0721662234/icongroupinterna**

- **Infectious Disease** by Barbara Bannister, et al; Paperback - 506 pages, 2nd edition (August 15, 2000), Blackwell Science Inc.; ISBN: 0632053194; **http://www.amazon.com/exec/obidos/ASIN/0632053194/icongroupinterna**
- **Infectious Disease Epidemiology: Theory and Practice** by Kenrad E. Nelson, et al; Hardcover - 600 pages (May 2000), Aspen Publishers, Inc.; ISBN: 083421766X; **http://www.amazon.com/exec/obidos/ASIN/083421766X/icongroupinterna**
- **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/icongroupinterna**
- **Mandell, Douglas, and Bennett's Principles & Practice of Infectious Diseases (2 Vol. Set)** by Gerald L. Mandell (Editor), et al; Hardcover - 3263 pages, 5th edition (June 15, 2000), Churchill Livingstone; ISBN: 044307593X; **http://www.amazon.com/exec/obidos/ASIN/044307593X/icongroupinterna**
- **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/icongroupinterna**
- **Molecular Epidemiology of Infectious Diseases** by R. C. Andrew Thompson; Hardcover - 326 pages, 1st edition (October 15, 2000), Edward Arnold; ISBN: 0340759097; **http://www.amazon.com/exec/obidos/ASIN/0340759097/icongroupinterna**
- **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/icongroupinterna**

Vocabulary Builder

Cardiac: Pertaining to the heart. [EU]

Encephalitis: Inflammation of the brain. [EU]

Glucose: D-glucose, a monosaccharide (hexose), C6H12O6, also known as dextrose (q.v.), found in certain foodstuffs, especially fruits, and in the normal blood of all animals. It is the end product of carbohydrate metabolism and is the chief source of energy for living organisms, its utilization being controlled by insulin. Excess glucose is converted to glycogen and stored in the liver and muscles for use as needed and, beyond that, is converted to fat and stored as adipose tissue. Glucose appears in the

urine in diabetes mellitus. [EU]

Histocompatibility: The degree of antigenic similarity between the tissues of different individuals, which determines the acceptance or rejection of allografts. [NIH]

Pulmonary: Pertaining to the lungs. [EU]

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]

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 typhoid fever 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 typhoid fever. 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 typhoid fever. Research can give you information on the side effects, interactions, and limitations of prescription drugs used in the treatment of typhoid fever. 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[38]

The Agency for Health Care Research and Quality has published extremely useful guidelines on how you can best participate in the medication aspects of typhoid fever. 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 typhoid fever 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 typhoid fever. 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.
- If you can get a refill, and how often.

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

- 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 typhoid fever). 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 typhoid fever. One such source is the United States Pharmacopeia. In 1820, eleven physicians met in Washington, D.C. to establish the first compendium of standard drugs for the United States. They called this compendium the "U.S. Pharmacopeia (USP)." Today, the USP is a non-profit organization consisting of 800 volunteer scientists, eleven elected officials, and 400 representatives of state associations and colleges of medicine and pharmacy. The USP is located in Rockville, Maryland, and its home page is located at **www.usp.org**. The USP currently provides standards for over 3,700 medications. The resulting USP DI® Advice for the Patient® can be accessed through the National Library of Medicine of the National Institutes of Health. The database is partially derived from lists of federally approved medications in the Food and Drug Administration's (FDA) Drug Approvals database.[39]

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

Of course, we as editors cannot be certain as to what medications you are taking. Therefore, we have compiled a list of medications associated with the treatment of typhoid fever. 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 typhoid fever:

- **Systemic - U.S. Brands:** Chloromycetin
  http://www.nlm.nih.gov/medlineplus/druginfo/chloramphenicolsystemic202127.html

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

Ciprofloxacin

- **Ophthalmic - U.S. Brands:** Ciloxan
  http://www.nlm.nih.gov/medlineplus/druginfo/ciprofloxacinophthalmic202655.html

Headache Medicines, Ergot Derivative-Containing

- **Systemic - U.S. Brands:** Cafergot; Cafertine; Cafetrate; D.H.E. 45; Ercaf; Ergo-Caff; Ergomar; Ergostat; Gotamine; Migergot; Wigraine
  http://www.nlm.nih.gov/medlineplus/druginfo/headachemedicinesergotderivati202216.html

Orlistat

- **Oral--Local - U.S.** Brands: Xenical
  http://www.nlm.nih.gov/medlineplus/druginfo/orlistatorallocal500006.html

Orphenadrine

- **Systemic - U.S. Brands:** Antiflex; Banflex; Flexoject; Mio-Rel; Myolin; Myotrol; Norflex; Orfro; Orphenate
  http://www.nlm.nih.gov/medlineplus/druginfo/orphenadrinesystemic202426.html

Orphenadrine and Aspirin

- **Systemic - U.S. Brands:** Norgesic; Norphadrine; Orphenagesic
  http://www.nlm.nih.gov/medlineplus/druginfo/orphenadrineandaspirinsystemic202427.html

Penicillins

- **Systemic - U.S. Brands:** Amoxil; Bactocill; Beepen-VK; Betapen-VK; Bicillin L-A; Cloxapen; Crysticillin 300 A.S.; Dycill; Dynapen; Geocillin; Geopen; Ledercillin VK; Mezlin; Nafcil; Nallpen; Omnipen; Omnipen-N; Pathocil; Pen Vee K; Pentids; Permapen; Pfizerpen; Pfizerpen-AS; Pi
  http://www.nlm.nih.gov/medlineplus/druginfo/penicillinssystemic202446.html

Probenecid

- **Systemic - U.S. Brands:** Benemid; Probalan
  http://www.nlm.nih.gov/medlineplus/druginfo/probenecidsystemic202480.html

Typhoid Vaccine Live Oral

- **Systemic - U.S. Brands:**
  http://www.nlm.nih.gov/medlineplus/druginfo/probenecidsystemic202480.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 typhoid fever (including those with contraindications):[40]

- **Ciprofloxacin**
  http://www.reutershealth.com/atoz/html/Ciprofloxacin.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**.

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

Other Web Sites

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

Contraindications and Interactions (Hidden Dangers)

Some of the medications mentioned in the previous discussions can be problematic for patients with typhoid fever--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 typhoid fever or potentially create deleterious side effects in patients with typhoid fever. 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 typhoid fever. 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 typhoid fever. The FDA warns patients to watch out for[41]:

- 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**.

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**

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

- **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**
- **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**

Vocabulary Builder

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

Ophthalmic: Pertaining to the eye. [EU]

Orphenadrine: A muscarinic antagonist used to treat drug-induced parkinsonism and to relieve pain from muscle spasm. [NIH]

Probenecid: The prototypical uricosuric agent. It inhibits the renal excretion of organic anions and reduces tubular reabsorption of urate. Probenecid has also been used to treat patients with renal impairment, and, because it reduces the renal tubular excretion of other drugs, has been used as an adjunct to antibacterial therapy. [NIH]

APPENDIX B. RESEARCHING ALTERNATIVE MEDICINE

Overview

Complementary and alternative medicine (CAM) is one of the most contentious aspects of modern medical practice. You may have heard of these treatments on the radio or on television. Maybe you have seen articles written about these treatments in magazines, newspapers, or books. Perhaps your friends or doctor have mentioned alternatives.

In this chapter, we will begin by giving you a broad perspective on complementary and alternative therapies. Next, we will introduce you to official information sources on CAM relating to typhoid fever. Finally, at the conclusion of this chapter, we will provide a list of readings on typhoid fever from various authors. We will begin, however, with the National Center for Complementary and Alternative Medicine's (NCCAM) overview of complementary and alternative medicine.

What Is CAM?[42]

Complementary and alternative medicine (CAM) covers a broad range of healing philosophies, approaches, and therapies. Generally, it is defined as those treatments and healthcare practices which are not taught in medical schools, used in hospitals, or reimbursed by medical insurance companies. Many CAM therapies are termed "holistic," which generally means that the healthcare practitioner considers the whole person, including physical, mental, emotional, and spiritual health. Some of these therapies are also known as "preventive," which means that the practitioner educates and

[42] Adapted from the NCCAM: **http://nccam.nih.gov/nccam/fcp/faq/index.html#what-is**.

treats the person to prevent health problems from arising, rather than treating symptoms after problems have occurred.

People use CAM treatments and therapies in a variety of ways. Therapies are used alone (often referred to as alternative), in combination with other alternative therapies, or in addition to conventional treatment (sometimes referred to as complementary). Complementary and alternative medicine, or "integrative medicine," includes a broad range of healing philosophies, approaches, and therapies. Some approaches are consistent with physiological principles of Western medicine, while others constitute healing systems with non-Western origins. While some therapies are far outside the realm of accepted Western medical theory and practice, others are becoming established in mainstream medicine.
Complementary and alternative therapies are used in an effort to prevent illness, reduce stress, prevent or reduce side effects and symptoms, or control or cure disease. Some commonly used methods of complementary or alternative therapy include mind/body control interventions such as visualization and relaxation, manual healing including acupressure and massage, homeopathy, vitamins or herbal products, and acupuncture.

What Are the Domains of Alternative Medicine?[43]

The list of CAM practices changes continually. The reason being is that these new practices and therapies are often proved to be safe and effective, and therefore become generally accepted as "mainstream" healthcare practices. Today, CAM practices may be grouped within five major domains: (1) alternative medical systems, (2) mind-body interventions, (3) biologically-based treatments, (4) manipulative and body-based methods, and (5) energy therapies. The individual systems and treatments comprising these categories are too numerous to list in this sourcebook. Thus, only limited examples are provided within each.

Alternative Medical Systems

Alternative medical systems involve complete systems of theory and practice that have evolved independent of, and often prior to, conventional biomedical approaches. Many are traditional systems of medicine that are practiced by individual cultures throughout the world, including a number of venerable Asian approaches.

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[43] Adapted from the NCCAM: **http://nccam.nih.gov/nccam/fcp/classify/index.html**.

Traditional oriental medicine emphasizes the balance or disturbances of qi (pronounced chi) or vital energy in health and disease, respectively. Traditional oriental medicine consists of a group of techniques and methods including acupuncture, herbal medicine, oriental massage, and qi gong (a form of energy therapy). Acupuncture involves stimulating specific anatomic points in the body for therapeutic purposes, usually by puncturing the skin with a thin needle.

Ayurveda is India's traditional system of medicine. Ayurvedic medicine (meaning "science of life") is a comprehensive system of medicine that places equal emphasis on body, mind, and spirit. Ayurveda strives to restore the innate harmony of the individual. Some of the primary Ayurvedic treatments include diet, exercise, meditation, herbs, massage, exposure to sunlight, and controlled breathing.

Other traditional healing systems have been developed by the world's indigenous populations. These populations include Native American, Aboriginal, African, Middle Eastern, Tibetan, and Central and South American cultures. Homeopathy and naturopathy are also examples of complete alternative medicine systems.

Homeopathic medicine is an unconventional Western system that is based on the principle that "like cures like," i.e., that the same substance that in large doses produces the symptoms of an illness, in very minute doses cures it. Homeopathic health practitioners believe that the more dilute the remedy, the greater its potency. Therefore, they use small doses of specially prepared plant extracts and minerals to stimulate the body's defense mechanisms and healing processes in order to treat illness.

Naturopathic medicine is based on the theory that disease is a manifestation of alterations in the processes by which the body naturally heals itself and emphasizes health restoration rather than disease treatment. Naturopathic physicians employ an array of healing practices, including the following: diet and clinical nutrition, homeopathy, acupuncture, herbal medicine, hydrotherapy (the use of water in a range of temperatures and methods of applications), spinal and soft-tissue manipulation, physical therapies (such as those involving electrical currents, ultrasound, and light), therapeutic counseling, and pharmacology.

Mind-Body Interventions

Mind-body interventions employ a variety of techniques designed to facilitate the mind's capacity to affect bodily function and symptoms. Only a select group of mind-body interventions having well-documented theoretical foundations are considered CAM. For example, patient education and cognitive-behavioral approaches are now considered "mainstream." On the other hand, complementary and alternative medicine includes meditation, certain uses of hypnosis, dance, music, and art therapy, as well as prayer and mental healing.

Biological-Based Therapies

This category of CAM includes natural and biological-based practices, interventions, and products, many of which overlap with conventional medicine's use of dietary supplements. This category includes herbal, special dietary, orthomolecular, and individual biological therapies.

Herbal therapy employs an individual herb or a mixture of herbs for healing purposes. An herb is a plant or plant part that produces and contains chemical substances that act upon the body. Special diet therapies, such as those proposed by Drs. Atkins, Ornish, Pritikin, and Weil, are believed to prevent and/or control illness as well as promote health. Orthomolecular therapies aim to treat disease with varying concentrations of chemicals such as magnesium, melatonin, and mega-doses of vitamins. Biological therapies include, for example, the use of laetrile and shark cartilage to treat cancer and the use of bee pollen to treat autoimmune and inflammatory diseases.

Manipulative and Body-Based Methods

This category includes methods that are based on manipulation and/or movement of the body. For example, chiropractors focus on the relationship between structure and function, primarily pertaining to the spine, and how that relationship affects the preservation and restoration of health. Chiropractors use manipulative therapy as an integral treatment tool.

In contrast, osteopaths place particular emphasis on the musculoskeletal system and practice osteopathic manipulation. Osteopaths believe that all of the body's systems work together and that disturbances in one system may have an impact upon function elsewhere in the body. Massage therapists manipulate the soft tissues of the body to normalize those tissues.

Energy Therapies

Energy therapies focus on energy fields originating within the body (biofields) or those from other sources (electromagnetic fields). Biofield therapies are intended to affect energy fields (the existence of which is not yet experimentally proven) that surround and penetrate the human body. Some forms of energy therapy manipulate biofields by applying pressure and/or manipulating the body by placing the hands in or through these fields. Examples include Qi gong, Reiki and Therapeutic Touch.

Qi gong is a component of traditional oriental medicine that combines movement, meditation, and regulation of breathing to enhance the flow of vital energy (qi) in the body, improve blood circulation, and enhance immune function. Reiki, the Japanese word representing Universal Life Energy, is based on the belief that, by channeling spiritual energy through the practitioner, the spirit is healed and, in turn, heals the physical body. Therapeutic Touch is derived from the ancient technique of "laying-on of hands." It is based on the premises that the therapist's healing force affects the patient's recovery and that healing is promoted when the body's energies are in balance. By passing their hands over the patient, these healers identify energy imbalances.

Bioelectromagnetic-based therapies involve the unconventional use of electromagnetic fields to treat illnesses or manage pain. These therapies are often used to treat asthma, cancer, and migraine headaches. Types of electromagnetic fields which are manipulated in these therapies include pulsed fields, magnetic fields, and alternating current or direct current fields.

Can Alternatives Affect My Treatment?

A critical issue in pursuing complementary alternatives mentioned thus far is the risk that these might have undesirable interactions with your medical treatment. It becomes all the more important to speak with your doctor who can offer advice on the use of alternatives. Official sources confirm this view. Though written for women, we find that the National Women's Health Information Center's advice on pursuing alternative medicine is appropriate for patients of both genders and all ages.[44]

[44] Adapted from **http://www.4woman.gov/faq/alternative.htm**.

Is It Okay to Want Both Traditional and Alternative or Complementary Medicine?

Should you wish to explore non-traditional types of treatment, be sure to discuss all issues concerning treatments and therapies with your healthcare provider, whether a physician or practitioner of complementary and alternative medicine. Competent healthcare management requires knowledge of both conventional and alternative therapies you are taking for the practitioner to have a complete picture of your treatment plan.

The decision to use complementary and alternative treatments is an important one. Consider before selecting an alternative therapy, the safety and effectiveness of the therapy or treatment, the expertise and qualifications of the healthcare practitioner, and the quality of delivery. These topics should be considered when selecting any practitioner or therapy.

Finding CAM References on Typhoid Fever

Having read the previous discussion, you may be wondering which complementary or alternative treatments might be appropriate for typhoid fever. For the remainder of this chapter, we will direct you to a number of official sources which can assist you in researching studies and publications. Some of these articles are rather technical, so some patience may be required.

National Center for Complementary and Alternative Medicine

The National Center for Complementary and Alternative Medicine (NCCAM) of the National Institutes of Health (**http://nccam.nih.gov**) has created a link to the National Library of Medicine's databases to allow patients to search for articles that specifically relate to typhoid fever and complementary medicine. To search the database, go to the following Web site: **www.nlm.nih.gov/nccam/camonpubmed.html**. Select "CAM on PubMed." Enter "typhoid fever" (or synonyms) into the search box. Click "Go." The following references provide information on particular aspects of complementary and alternative medicine (CAM) that are related to typhoid fever:

- **Antibacterial effect of some leaf extracts on Salmonella typhi.**
  Author(s): Gehlot D, Bohra A.

Source: Indian J Med Sci. 2000 March; 54(3): 102-5.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11227613&dopt=Abstract

- **Chemical and immunological characterization of a low molecular weight outer membrane protein of Salmonella typhi.**
  Author(s): de Andrade CM, Ferreira AG, da Silva JD, Nascimento HJ, da Silva JG Jr.
  Source: Microbiol Immunol. 1998; 42(8): 521-6.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=9776392&dopt=Abstract

- **Dr F. W. E. Hare and the cold bath treatment of typhoid fever.**
  Author(s): Thearle MJ.
  Source: Occas Pap Med Hist Aust. 1987; 3: 151-71. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11621832&dopt=Abstract

- **Efficacy of some nupe medicinal plants against Salmonella typhi: an in vitro study.**
  Author(s): Evans CE, Banso A, Samuel OA.
  Source: Journal of Ethnopharmacology. 2002 April; 80(1): 21-4.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11891083&dopt=Abstract

- **Phytochemical and antimicrobial properties of constituents of "Ogwu Odenigbo", a popular Nigerian herbal medicine for typhoid fever.**
  Author(s): Ebi GC, Kamalu TN.
  Source: Phytotherapy Research : Ptr. 2001 February; 15(1): 73-5.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11180528&dopt=Abstract

- **Prophylactic therapy of Salmonella typhi septicemia in mice with a traditionally prescribed crude drug formulation.**
  Author(s): Sohni YR, Kaimal P, Bhatt RM.
  Source: Journal of Ethnopharmacology. 1995 February; 45(2): 141-7.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=7776663&dopt=Abstract

- **Typhoid fever in the park: epidemiology of an outbreak at a cultural interface.**

Author(s): Cote TR, Convery H, Robinson D, Ries A, Barrett T, Frank L, Furlong W, Horan J, Dwyer D.
Source: Journal of Community Health. 1995 December; 20(6): 451-8.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=8568020&dopt=Abstract

Additional Web Resources

A number of additional Web sites offer encyclopedic information covering CAM and related topics. The following is a representative sample:

- Alternative Medicine Foundation, Inc.: **http://www.herbmed.org/**
- AOL: **http://search.aol.com/cat.adp?id=169&layer=&from=subcats**
- Chinese Medicine: **http://www.newcenturynutrition.com/**
- drkoop.com®: **http://www.drkoop.com/InteractiveMedicine/IndexC.html**
- Family Village: **http://www.familyvillage.wisc.edu/med_altn.htm**
- Google: **http://directory.google.com/Top/Health/Alternative/**
- Healthnotes: **http://www.thedacare.org/healthnotes/**
- Open Directory Project: **http://dmoz.org/Health/Alternative/**
- TPN.com: **http://www.tnp.com/**
- Yahoo.com: **http://dir.yahoo.com/Health/Alternative_Medicine/**
- WebMD®Health: **http://my.webmd.com/drugs_and_herbs**
- WellNet: **http://www.wellnet.ca/herbsa-c.htm**
- WholeHealthMD.com: **http://www.wholehealthmd.com/reflib/0,1529,,00.html**

The following is a specific Web list relating to typhoid fever; 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:

- **Herbs and Supplements**

  Bilberry
  Source: Prima Communications, Inc.
  Hyperlink: http://www.personalhealthzone.com/pg000107.html

General References

A good place to find general background information on CAM is the National Library of Medicine. It has prepared within the MEDLINEplus system an information topic page dedicated to complementary and alternative medicine. To access this page, go to the MEDLINEplus site at: **www.nlm.nih.gov/medlineplus/alternativemedicine.html.** This Web site provides a general overview of various topics and can lead to a number of general sources. The following additional references describe, in broad terms, alternative and complementary medicine (sorted alphabetically by title; hyperlinks provide rankings, information, and reviews at Amazon.com):

- **Herbal Antibiotics : Natural Alternatives for Treating Drug-Resistant Bacteria (Storey Medicinal Herb Guide)** by Stephen Harrod Buhner; Paperback - 128 pages (September 1999), Storey Books; ISBN: 1580171486; **http://www.amazon.com/exec/obidos/ASIN/1580171486/icongroupinterna**
- **Natural Alternatives to Antibiotics** by John McKenna; Paperback - 176 pages (November 1998), Avery Penguin Putnam; ISBN: 0895298392; **http://www.amazon.com/exec/obidos/ASIN/0895298392/icongroupinterna**
- **Alternative Medicine for Dummies** by James Dillard (Author); Audio Cassette, Abridged edition (1998), Harper Audio; ISBN: 0694520659; **http://www.amazon.com/exec/obidos/ASIN/0694520659/icongroupinterna**
- **Complementary and Alternative Medicine Secrets** by W. Kohatsu (Editor); Hardcover (2001), Hanley & Belfus; ISBN: 1560534400; **http://www.amazon.com/exec/obidos/ASIN/1560534400/icongroupinterna**
- **Dictionary of Alternative Medicine** by J. C. Segen; Paperback-2nd edition (2001), Appleton & Lange; ISBN: 0838516211; **http://www.amazon.com/exec/obidos/ASIN/0838516211/icongroupinterna**
- **Eat, Drink, and Be Healthy: The Harvard Medical School Guide to Healthy Eating** by Walter C. Willett, MD, et al; Hardcover - 352 pages (2001), Simon & Schuster; ISBN: 0684863375; **http://www.amazon.com/exec/obidos/ASIN/0684863375/icongroupinterna**
- **Encyclopedia of Natural Medicine, Revised 2nd Edition** by Michael T. Murray, Joseph E. Pizzorno; Paperback - 960 pages, 2nd Rev edition (1997), Prima Publishing; ISBN: 0761511571; **http://www.amazon.com/exec/obidos/ASIN/0761511571/icongroupinterna**
- **Integrative Medicine: An Introduction to the Art & Science of Healing** by Andrew Weil (Author); Audio Cassette, Unabridged edition (2001), Sounds True; ISBN: 1564558541; **http://www.amazon.com/exec/obidos/ASIN/1564558541/icongroupinterna**

- **New Encyclopedia of Herbs & Their Uses** by Deni Bown; Hardcover - 448 pages, Revised edition (2001), DK Publishing; ISBN: 078948031X; **http://www.amazon.com/exec/obidos/ASIN/078948031X/icongroupinterna**
- **Textbook of Complementary and Alternative Medicine** by Wayne B. Jonas; Hardcover (2003), Lippincott, Williams & Wilkins; ISBN: 0683044370; **http://www.amazon.com/exec/obidos/ASIN/0683044370/icongroupinterna**

For additional information on complementary and alternative medicine, ask your doctor or write to:

National Institutes of Health
National Center for Complementary and Alternative Medicine Clearinghouse
P. O. Box 8218
Silver Spring, MD 20907-8218

Vocabulary Builder

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

Brucella: A genus of gram-negative, aerobic bacteria that causes brucellosis. Its cells are nonmotile coccobacilli and are animal parasites and pathogens. The bacterium is transmissible to humans through contact with infected dairy products or tissue. [NIH]

Brucellosis: Infection caused by bacteria of the genus brucella mainly involving the reticuloendothelial system. This condition is characterized by fever, weakness, malaise, and weight loss. [NIH]

Ethnopharmacology: The study of the actions and properties of drugs, usually derived from medicinal plants, indigenous to a population or ethnic group. [NIH]

Expeditions: Usually refers to planned scientific data-gathering excursions. [NIH]

Septicemia: Systemic disease associated with the presence and persistence of pathogenic microorganisms or their toxins in the blood. Called also blood poisoning. [EU]

APPENDIX C. 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 typhoid fever. 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 typhoid fever may be given different recommendations. Some recommendations may be directly related to typhoid fever, 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 typhoid fever. We will then show you how to find studies dedicated specifically to nutrition and typhoid fever.

Food and Nutrition: General Principles

What Are Essential Foods?

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

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

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

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

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

- **Vitamin B^3**, also known as niacin, is important for healthy skin and helps the body use energy; food sources for niacin include peas, peanuts, fish, and whole grains
- **Vitamin B^6**, also known as pyridoxine, is important for the regulation of cells in the nervous system and is vital for blood formation; food sources for pyridoxine include bananas, whole grains, meat, and fish.
- **Vitamin B^{12}** is vital for a healthy nervous system and for the growth of red blood cells in bone marrow; food sources for vitamin 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:[45]

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

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

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

What Are Dietary Supplements?[46]

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."[47] According to the ODS, dietary supplements can have an important impact on the prevention and management of disease and on the maintenance of health.[48] The ODS notes that considerable research on the effects of dietary supplements has been conducted in Asia and Europe where

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

[47] 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**.

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

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

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

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

Finding Studies on Typhoid Fever

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.[49] IBIDS is available to the public free of charge through the ODS Internet page: **http://ods.od.nih.gov/databases/ibids.html**.

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

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

periodically as this database is frequently updated. More studies can be found by searching the Full IBIDS Database. Healthcare professionals and researchers generally use the third option, which lists peer-reviewed citations. In all cases, we suggest that you take advantage of the "Advanced Search" option that allows you to retrieve up to 100 fully explained references in a comprehensive format. Type "typhoid fever" (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 "typhoid fever" (or a synonym):

- **Comparison of enteric-coated capsules and liquid formulation of Ty21a typhoid vaccine in randomised controlled field trial.**
  Author(s): Center for Vaccine Development, University of Maryland School of Medicine, Baltimore 21201.
  Source: Levine, M M Ferreccio, C Cryz, S Ortiz, E Lancet. 1990 October 13; 336(8720): 891-4 0140-6736
- **Continuous intra arterial vasopressin infusion for control of typhoid hemorrhage.**
  Author(s): Department of Surgery, Seth G S Medical College, Bombay.
  Source: Vaidya, A Supe, A Samsi, A B Ramakantan, R Indian-J-Gastroenterol. 1990 July; 9(3): 225-6 0254-8860
- **Hydrocortisone in chloramphenicol-treated severe typhoid fever in Papua New Guinea.**
  Author(s): Goroka Base Hospital, Papua New Guinea.
  Source: Rogerson, S J Spooner, V J Smith, T A Richens, J Trans-R-Soc-Trop-Med-Hyg. 1991 Jan-February; 85(1): 113-6 0035-9203
- **Is travel prophylaxis worth while? Economic appraisal of prophylactic measures against malaria, hepatitis A, and typhoid in travellers.**
  Author(s): Hospital for Tropical Diseases Travel Clinic, London.
  Source: Behrens, R H Roberts, J A BMJ. 1994 October 8; 309(6959): 918-22 0959-8138
- **Phytochemical and antimicrobial properties of constituents of "Ogwu Odenigbo", a popular Nigerian herbal medicine for typhoid fever.**
  Author(s): Department of Pharmaceutical Chemistry, University of Nigeria, Nsukka, Nigeria. misunn@aol.com
  Source: Ebi, G C Kamalu, T N Phytother-Res. 2001 February; 15(1): 73-5 0951-418X

- **Reduction in incidence of experimental fowl typhoid by incorporation of a commercial formic acid preparation (Bio-Add) into poultry feed.**
  Author(s): Division of Environmental Microbiology, Institute for Animal Health, Compton Laboratory, Newbury, United Kingdom.
  Source: Berchieri, A Barrow, P A Poult-Sci. 1996 March; 75(3): 339-41 0032-5791
- **Serum transcobalamin II level in glucose-6-phosphate dehydrogenase deficient subjects with typhoid fever.**
  Author(s): Department of Tropical Radioisotopes, Faculty of Tropical Medicine, Siriraj Hospital, Mahidol University, Bangkok, Thailand.
  Source: Areekul, S Paksanond, S Thanomsak, W Vatanavicharn, S J-Med-Assoc-Thai. 1996 May; 79(5): 325-9 0125-2208
- **Typhoid carriers among patients with gallstones are at increased risk for carcinoma of the gallbladder.**
  Author(s): Department of Gastroenterology, All India Institute of Medical Sciences, New Delhi.
  Source: Dutta, U Garg, P K KuMarch, R Tandon, R K Am-J-Gastroenterol. 2000 Mar; 95(3): 784-7 0002-9270
- **Typhoid fever at a resort hotel in New York: a large outbreak with an unusual vehicle.**
  Author(s): Bureau of Communicable Disease Control, Wadsworth Center for Laboratories and Research, New York State Department of Health, Albany.
  Source: Birkhead, G S Morse, D L Levine, W C Fudala, J K Kondracki, S F Chang, H G Shayegani, M Novick, L Blake, P A J-Infect-Dis. 1993 May; 167(5): 1228-32 0022-1899
- **Typhoid fever in the Neapolitan area: a case-control study.**
  Author(s): Laboratorio di Epidemiologia, Istituto Superiore di Sanita, Rome, Italy.
  Source: Stroffolini, T Manzillo, G De Sena, R Manzillo, E Pagliano, P Zaccarelli, M Russo, M Soscia, M Giusti, G Eur-J-Epidemiol. 1992 July; 8(4): 539-42 0393-2990
- **Typhoid in the highlands of Papua New Guinea 1984-1990: a hospital-based perspective.**
  Author(s): Academic Department of Genito-urinary Medicine, University College London Medical School, England, UK.
  Source: Richens, J P-N-G-Med-J. 1995 December; 38(4): 305-14 0031-1480

Federal Resources on Nutrition

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

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

Additional Web Resources

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

- AOL: **http://search.aol.com/cat.adp?id=174&layer=&from=subcats**
- Family Village: **http://www.familyvillage.wisc.edu/med_nutrition.html**
- Google: **http://directory.google.com/Top/Health/Nutrition/**
- Healthnotes: **http://www.thedacare.org/healthnotes/**
- Open Directory Project: **http://dmoz.org/Health/Nutrition/**

- Yahoo.com: **http://dir.yahoo.com/Health/Nutrition/**
- WebMD®Health: **http://my.webmd.com/nutrition**
- WholeHealthMD.com: **http://www.wholehealthmd.com/reflib/0,1529,,00.html**

Vocabulary Builder

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

Arterial: Pertaining to an artery or to the arteries. [EU]

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

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

Carcinoma: A malignant new growth made up of epithelial cells tending to infiltrate the surrounding tissues and give rise to metastases. [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]

Hemorrhage: Bleeding or escape of blood from a vessel. [NIH]

Hydrocortisone: The main glucocorticoid secreted by the adrenal cortex. Its synthetic counterpart is used, either as an injection or topically, in the treatment of inflammation, allergy, collagen diseases, asthma, adrenocortical deficiency, shock, and some neoplastic conditions. [NIH]

Infusion: The therapeutic introduction of a fluid other than blood, as saline solution, solution, into a vein. [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]

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]

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]

Thermoregulation: Heat regulation. [EU]

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

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

APPENDIX D. 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.[50]

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

Finding a Local Medical Library

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

Medical Libraries Open to the Public

In addition to the NN/LM, the National Library of Medicine (NLM) lists a number of libraries that are generally open to the public and have reference facilities. The following is the NLM's list plus hyperlinks to each library Web site. These Web pages can provide information on hours of operation and other restrictions. The list below is a small sample of libraries recommended by the National Library of Medicine (sorted alphabetically by name of the U.S. state or Canadian province where the library is located):[51]

- **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/**

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

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

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

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

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

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

APPENDIX E. YOUR RIGHTS AND INSURANCE

Overview

Any patient with typhoid fever 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.[52]

Information Disclosure

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

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

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

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

Choice of Providers and Plans

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

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

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

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

Access to Emergency Services

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

Participation in Treatment Decisions

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

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

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

Health plans, health providers, and healthcare facilities should:

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

Respect and Nondiscrimination

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

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

Confidentiality of Health Information

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

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

Complaints and Appeals

Consumers have the right to a fair and efficient process for resolving differences with their health plans, healthcare providers, and the institutions that serve them, including a rigorous system of internal review and an independent system of external review. A free copy of the Patient's Bill of Rights is available from the American Hospital Association.[53]

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."[54] In a healthcare system that protects consumers' rights, it is reasonable to expect and encourage consumers to assume certain responsibilities. Greater individual involvement by the consumer in his or her care increases the likelihood of achieving the best outcome and helps support a quality-oriented, cost-conscious environment. Such responsibilities include:

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

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[53] 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.

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

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

Choosing an Insurance Plan

There are a number of official government agencies that help consumers understand their healthcare insurance choices.[55] The U.S. Department of Labor, in particular, recommends ten ways to make your health benefits choices work best for you.[56]

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

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

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

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

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

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

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

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

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

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

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

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

Medicare and Medicaid

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

contact information on how to find more in-depth information about Medicaid.[57]

Who is Eligible for Medicare?

Generally, you are eligible for Medicare if you or your spouse worked for at least 10 years in Medicare-covered employment and you are 65 years old and a citizen or permanent resident of the United States. You might also qualify for coverage if you are under age 65 but have a disability or End-Stage Renal disease (permanent kidney failure requiring dialysis or transplant). Here are some simple guidelines:
You can get Part A at age 65 without having to pay premiums if:

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

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

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

Medicare has two parts:

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

Part A (Hospital Insurance)

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

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

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

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

Part B (Medical Insurance)

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

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

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

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

Medicaid

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

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

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

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

NORD's Medication Assistance Programs

Finally, the National Organization for Rare Disorders, Inc. (NORD) administers medication programs sponsored by humanitarian-minded pharmaceutical and biotechnology companies to help uninsured or under-insured individuals secure life-saving or life-sustaining drugs.[58] NORD

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

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

Additional Resources

In addition to the references already listed in this chapter, you may need more information on health insurance, hospitals, or the healthcare system in general. The NIH has set up an excellent guidance Web site that addresses these and other issues. Topics include:[59]

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

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

Vocabulary Builder

Abdominal Pain: Sensation of discomfort, distress, or agony in the abdominal region. [NIH]

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

Cholecystectomy: Surgical removal of the gallbladder. [NIH]

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

Hepatic: Pertaining to the liver. [EU]

Hepatomegaly: Enlargement of the liver. [EU]

Intravenous: Within a vein or veins. [EU]

Platelet Count: A count of the number of platelets per unit volume in a sample of venous blood. [NIH]

ONLINE GLOSSARIES

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

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

Beyond these, MEDLINEplus contains a very user-friendly encyclopedia covering every aspect of medicine (licensed from A.D.A.M., Inc.). The ADAM Medical Encyclopedia Web site address is **http://www.nlm.nih.gov/medlineplus/encyclopedia.html**. ADAM is also available on commercial Web sites such as drkoop.com (**http://www.drkoop.com/**) and Web MD (**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 typhoid fever and keep them on file. The NIH, in particular, suggests that patients with typhoid fever visit the following Web sites in the ADAM Medical Encyclopedia:

- **Basic Guidelines for Typhoid Fever**

Typhoid fever
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/001332.htm

- **Signs & Symptoms for Typhoid Fever**

Abdominal pain
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003120.htm

Abdominal tenderness
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003120.htm

Agitation
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003212.htm

Chills
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003091.htm

Confusion
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003205.htm

Constipation
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003125.htm

Cough
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003072.htm

Decreased urine output
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003147.htm

Diarrhea
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003126.htm

Erythema
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003220.htm

Fatigue
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003088.htm

Fever
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003090.htm

GI bleeding
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003133.htm

Hallucinations
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003258.htm

Headache
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003024.htm

Hepatomegaly
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003275.htm

Hepatosplenomegaly
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003275.htm

Lethargic
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003088.htm

Loss of appetite
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003121.htm

Malaise
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003089.htm

Myalgia
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003178.htm

Patches
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003231.htm

Rash
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003220.htm

Sore throat
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003053.htm

Splenomegaly
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003276.htm

Stools, bloody
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003130.htm

Weakness
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003174.htm

- **Diagnostics and Tests for Typhoid Fever**

Abdominal film
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003815.htm

ALT
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003473.htm

Biopsy
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003416.htm

Blood culture
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003744.htm

Bone marrow biopsy
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003934.htm

Bone marrow culture
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003682.htm

ELISA
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003332.htm

Platelet count
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003647.htm

Platelets
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003647.htm

Serology
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003511.htm

Stool culture
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003758.htm

White blood cell count
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003643.htm

- **Surgery and Procedures for Typhoid Fever**

Cholecystectomy
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/002930.htm

- **Background Topics for Typhoid Fever**

Antibody
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/002223.htm

Antigen
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/002224.htm

Chronic
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/002312.htm

Electrolytes
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/002350.htm

Endemic
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/002362.htm

Hepatic
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/002378.htm

Immunity
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/000821.htm

Intravenous
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/002383.htm

Phenol
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/002903.htm

Systemic
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/002294.htm

Online Dictionary Directories

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

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

TYPHOID FEVER 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.

Alimentary: Pertaining to food or nutritive material, or to the organs of digestion. [EU]

Ampicillin: Semi-synthetic derivative of penicillin that functions as an orally active broad-spectrum antibiotic. [NIH]

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 ode 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]

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

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

Arterial: Pertaining to an artery or to the arteries. [EU]

Aspergillosis: Infections with fungi of the genus aspergillus. [NIH]

Bacteremia: The presence of viable bacteria circulating in the blood. Fever, chills, tachycardia, and tachypnea are common acute manifestations of

bacteremia. The majority of cases are seen in already hospitalized patients, most of whom have underlying diseases or procedures which render their bloodstreams susceptible to invasion. [NIH]

Bacteria: Unicellular prokaryotic microorganisms which generally possess rigid cell walls, multiply by cell division, and exhibit three principal forms: round or coccal, rodlike or bacillary, and spiral or spirochetal. [NIH]

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

Blastomycosis: A fungal infection that may appear in two forms: 1) a primary lesion characterized by the formation of a small cutaneous nodule and small nodules along the lymphatics that may heal within several months; and 2) chronic granulomatous lesions characterized by thick crusts, warty growths, and unusual vascularity and infection in the middle or upper lobes of the lung. [NIH]

Brucella: A genus of gram-negative, aerobic bacteria that causes brucellosis. Its cells are nonmotile coccobacilli and are animal parasites and pathogens. The bacterium is transmissible to humans through contact with infected dairy products or tissue. [NIH]

Brucellosis: Infection caused by bacteria of the genus brucella mainly involving the reticuloendothelial system. This condition is characterized by fever, weakness, malaise, and weight loss. [NIH]

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, (CH2O)n. The most important carbohydrates are the starches, sugars, celluloses, and gums. They are classified into mono-, di-, tri-, poly- and heterosaccharides. [EU]

Carcinoma: A malignant new growth made up of epithelial cells tending to infiltrate the surrounding tissues and give rise to metastases. [EU]

Cardiac: Pertaining to the heart. [EU]

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

Cefixime: A third-generation cephalosporin antibiotic that is stable to hydrolysis by beta-lactamases. [NIH]

Cholecystectomy: Surgical removal of the gallbladder. [NIH]

Cholera: An acute diarrheal disease endemic in India and Southeast Asia whose causative agent is vibrio cholerae. This condition can lead to severe dehydration in a matter of hours unless quickly treated. [NIH]

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

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

Ciprofloxacin: A carboxyfluoroquinoline antimicrobial agent that is effective against a wide range of microorganisms. It has been successfully and safely used in the treatment of resistant respiratory, skin, bone, joint, gastrointestinal, urinary, and genital infections. [NIH]

Citrobacter: A genus of gram-negative, rod-shaped enterobacteria that can use citrate as the sole source of carbon. [NIH]

Clotrimazole: An imidazole derivative with a broad spectrum of antimycotic activity. It inhibits biosynthesis of the sterol ergostol, 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]

Confusion: Disturbed orientation in regard to time, place, or person, sometimes accompanied by disordered consciousness. [EU]

Conjugated: Acting or operating as if joined; simultaneous. [EU]

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

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

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

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

Cytotoxic: Pertaining to or exhibiting cytotoxicity. [EU]

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

Deprivation: Loss or absence of parts, organs, powers, or things that are needed. [EU]

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

Dietetics: The study and regulation of the diet. [NIH]

Diphtheria: A localized infection of mucous membranes or skin caused by toxigenic strains of corynebacterium diphtheriae. It is characterized by the presence of a pseudomembrane at the site of infection. Diphtheria Toxin, produced by C. diphtheriae, can cause myocarditis, polyneuritis, and other systemic toxic effects. [NIH]

Dysentery: Any of various disorders marked by inflammation of the intestines, especially of the colon, and attended by pain in the abdomen, tenesmus, and frequent stools containing blood and mucus. Causes include chemical irritants, bacteria, protozoa, or parasitic worms. [EU]

Echinococcosis: An infection caused by the infestation of the larval form of tapeworms of the genus Echinococcus. The liver, lungs, and kidney are the most common areas of infestation. [NIH]

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

Encephalitis: Inflammation of the brain. [EU]

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

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]

Enterocolitis: Inflammation involving both the small intestine and the colon; see also enteritis. [EU]

Epidemic: Occurring suddenly in numbers clearly in excess of normal expectancy; said especially of infectious diseases but applied also to any disease, injury, or other health-related event occurring in such outbreaks. [EU]

Epidemiological: Relating to, or involving epidemiology. [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]

Escherichia: A genus of gram-negative, facultatively anaerobic, rod-shaped bacteria whose organisms occur in the lower part of the intestine of warm-blooded animals. The species are either nonpathogenic or opportunistic pathogens. [NIH]

Ethnopharmacology: The study of the actions and properties of drugs,

usually derived from medicinal plants, indigenous to a population or ethnic group. [NIH]

Expeditions: Usually refers to planned scientific data-gathering excursions. [NIH]

Fascioliasis: Helminth infection of the liver caused by species of Fasciola. [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]

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

Fibrosis: The formation of fibrous tissue; fibroid or fibrous degeneration [EU]

Filariasis: Infections with nematodes of the superfamily filarioidea. The presence of living worms in the body is mainly asymptomatic but the death of adult worms leads to granulomatous inflammation and permanent fibrosis. Organisms of the genus Elaeophora infect wild elk and domestic sheep causing ischaemic necrosis of the brain, blindness, and dermatosis of the face. [NIH]

Fleas: Parasitic, blood-sucking, wingless insects comprising the order Siphonaptera. [NIH]

Gastroenteritis: An acute inflammation of the lining of the stomach and intestines, characterized by anorexia, nausea, diarrhoea, abdominal pain, and weakness, which has various causes, including food poisoning due to infection with such organisms as Escherichia coli, Staphylococcus aureus, and Salmonella species; consumption of irritating food or drink; or psychological factors such as anger, stress, and fear. Called also enterogastritis. [EU]

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

Glucose: D-glucose, a monosaccharide (hexose), C6H12O6, also known as dextrose (q.v.), found in certain foodstuffs, especially fruits, and in the normal blood of all animals. It is the end product of carbohydrate metabolism and is the chief source of energy for living organisms, its utilization being controlled by insulin. Excess glucose is converted to glycogen and stored in the liver and muscles for use as needed and, beyond that, is converted to fat and stored as adipose tissue. Glucose appears in the urine in diabetes mellitus. [EU]

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

Hemorrhage: Bleeding or escape of blood from a vessel. [NIH]

Hepatic: Pertaining to the liver. [EU]

Hepatitis: Inflammation of the liver. [EU]

Hepatomegaly: Enlargement of the liver. [EU]

Histocompatibility: The degree of antigenic similarity between the tissues of different individuals, which determines the acceptance or rejection of allografts. [NIH]

Hybridization: The genetic process of crossbreeding to produce a hybrid. Hybrid nucleic acids can be formed by nucleic acid hybridization of DNA and RNA molecules. Protein Hybridization allows for hybrid proteins to be formed from polypeptide chains. [NIH]

Hydrocortisone: The main glucocorticoid secreted by the adrenal cortex. Its synthetic counterpart is used, either as an injection or topically, in the treatment of inflammation, allergy, collagen diseases, asthma, adrenocortical deficiency, shock, and some neoplastic conditions. [NIH]

Idiopathic: Of the nature of an idiopathy; self-originated; of unknown causation. [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]

Immunization: The induction of immunity. [EU]

Immunogenic: Producing immunity; evoking an immune response. [EU]

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]

Infusion: The therapeutic introduction of a fluid other than blood, as saline solution, solution, into a vein. [EU]

Intravenous: Within a vein or veins. [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]

Larva: Wormlike or grublike stage, following the egg in the life cycle of insects, worms, and other metamorphosing animals. [NIH]

Leprosy: A chronic granulomatous infection caused by mycobacterium leprae. The granulomatous lesions are manifested in the skin, the mucous membranes, and the peripheral nerves. Two polar or principal types are lepromatous and tuberculoid. [NIH]

Malaise: A vague feeling of bodily discomfort. [EU]

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

Microorganism: A microscopic organism; those of medical interest include bacteria, viruses, fungi and protozoa. [EU]

Microscopy: The application of microscope magnification to the study of materials that cannot be properly seen by the unaided eye. [NIH]

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

Mononucleosis: The presence of an abnormally large number of mononuclear leucocytes (monocytes) in the blood. The term is often used alone to refer to infectious mononucleosis. [EU]

Myalgia: Pain in a muscle or muscles. [EU]

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

Myiasis: The invasion of living tissues of man and other mammals by dipterous larvae. [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]

Neutrophil: Having an affinity for neutral dyes. [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]

Operon: The genetic unit consisting of a feedback system under the control of an operator gene, in which a structural gene transcribes its message in the form of mRNA upon blockade of a repressor produced by a regulator gene. Included here is the attenuator site of bacterial operons where transcription termination is regulated. [NIH]

Ophthalmic: Pertaining to the eye. [EU]

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

Orphenadrine: A muscarinic antagonist used to treat drug-induced

parkinsonism and to relieve pain from muscle spasm. [NIH]

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

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

Parenteral: Not through the alimentary canal but rather by injection through some other route, as subcutaneous, intramuscular, intraorbital, intracapsular, intraspinal, intrasternal, intravenous, etc. [EU]

Pathogen: Any disease-producing microorganism. [EU]

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

Perforation: 1. the act of boring or piercing through a part. 2. a hole made through a part or substance. [EU]

Phagosomes: Membrane-bound cytoplasmic vesicles formed by invagination of phagocytized material. They fuse with lysosomes to form phagolysosomes in which the hydrolytic enzymes of the lysosome digest the phagocytized material. [NIH]

Platelet Count: A count of the number of platelets per unit volume in a sample of venous blood. [NIH]

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

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

Probenecid: The prototypical uricosuric agent. It inhibits the renal excretion of organic anions and reduces tubular reabsorption of urate. Probenecid has also been used to treat patients with renal impairment, and, because it reduces the renal tubular excretion of other drugs, has been used as an adjunct to antibacterial therapy. [NIH]

Protozoan: 1. any individual of the protozoa; protozoon. 2. of or pertaining to the protozoa; protozoal. [EU]

Pseudomonas: A genus of gram-negative, aerobic, rod-shaped bacteria widely distributed in nature. Some species are pathogenic for humans, animals, and plants. [NIH]

Pulmonary: Pertaining to the lungs. [EU]

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]

Recombinant: 1. a cell or an individual with a new combination of genes not found together in either parent; usually applied to linked genes. [EU]

Regulon: In eukaryotes, a genetic unit consisting of a noncontiguous group of genes under the control of a single regulator gene. In bacteria, regulons are global regulatory systems involved in the interplay of pleiotropic regulatory domains. These regulatory systems consist of several operons. [NIH]

Rhinitis: Inflammation of the mucous membrane of the nose. [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]

Rubella: An acute, usually benign, infectious disease caused by a togavirus and most often affecting children and nonimmune young adults, in which the virus enters the respiratory tract via droplet nuclei and spreads to the lymphatic system. It is characterized by a slight cold, sore throat, and fever, followed by enlargement of the postauricular, suboccipital, and cervical lymph nodes, and the appearances of a fine pink rash that begins on the head and spreads to become generalized. Called also German measles, roetln, röteln, and three-day measles, and rubeola in French and Spanish. [EU]

Salmonella: A genus of gram-negative, facultatively anaerobic, rod-shaped bacteria that utilizes citrate as a sole carbon source. It is pathogenic for humans, causing enteric fevers, gastroenteritis, and bacteremia. Food poisoning is the most common clinical manifestation. Organisms within this genus are separated on the basis of antigenic characteristics, sugar fermentation patterns, and bacteriophage susceptibility. [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]

Secretion: 1. the process of elaborating a specific product as a result of the activity of a gland; this activity may range from separating a specific substance of the blood to the elaboration of a new chemical substance. 2. any substance produced by secretion. [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]

Septicemia: Systemic disease associated with the presence and persistence of pathogenic microorganisms or their toxins in the blood. Called also blood poisoning. [EU]

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]

Spectrum: A charted band of wavelengths of electromagnetic vibrations obtained by refraction and diffraction. By extension, a measurable range of activity, such as the range of bacteria affected by an antibiotic (antibacterial s.) or the complete range of manifestations of a disease. [EU]

Sporotrichosis: The commonest and least serious of the deep mycoses, characterized by nodular lesions of the cutaneous and subcutaneous tissues. It is caused by inhalation of contaminated dust or by infection of a wound. [NIH]

Synergistic: Acting together; enhancing the effect of another force or agent. [EU]

Syphilis: A contagious venereal disease caused by the spirochete treponema pallidum. [NIH]

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

Tetanus: A disease caused by tetanospasmin, a powerful protein toxin produced by clostridium tetani. Tetanus usually occurs after an acute injury, such as a puncture wound or laceration. Generalized tetanus, the most common form, is characterized by tetanic muscular contractions and hyperreflexia. Localized tetanus presents itself as a mild condition with manifestations restricted to muscles near the wound. It may progress to the generalized form. [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]

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]

Transfusion: The introduction of whole blood or blood component directly into the blood stream. [EU]

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

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

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

Tuberculosis: Any of the infectious diseases of man and other animals caused by species of mycobacterium. [NIH]

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

Vaccination: The introduction of vaccine into the body for the purpose of inducing immunity. Coined originally to apply to the injection of smallpox vaccine, the term has come to mean any immunizing procedure in which vaccine is injected. [EU]

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

Varicella: Chicken pox. [EU]

Vibrio: A genus of vibrionaceae, made up of short, slightly curved, motile, gram-negative rods. Various species produce cholera and other gastrointestinal disorders as well as abortion in sheep and cattle. [NIH]

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]

Viruses: Minute infectious agents whose genomes are composed of DNA or RNA, but not both. They are characterized by a lack of independent metabolism and the inability to replicate outside living host cells. [NIH]

Yaws: A systemic non-venereal infection of the tropics caused by Treponema pallidum subspecies pertenue. [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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