

Chapter 7

How to Find and Access Published Information on Emerging Infectious Diseases

“Books are the carriers of civilization. Without books, history is silent, literature is dumb, science crippled, thought and speculation at a standstill. Without books, the development of civilization would have been impossible. They are the engines of change.” (Tuchman)¹

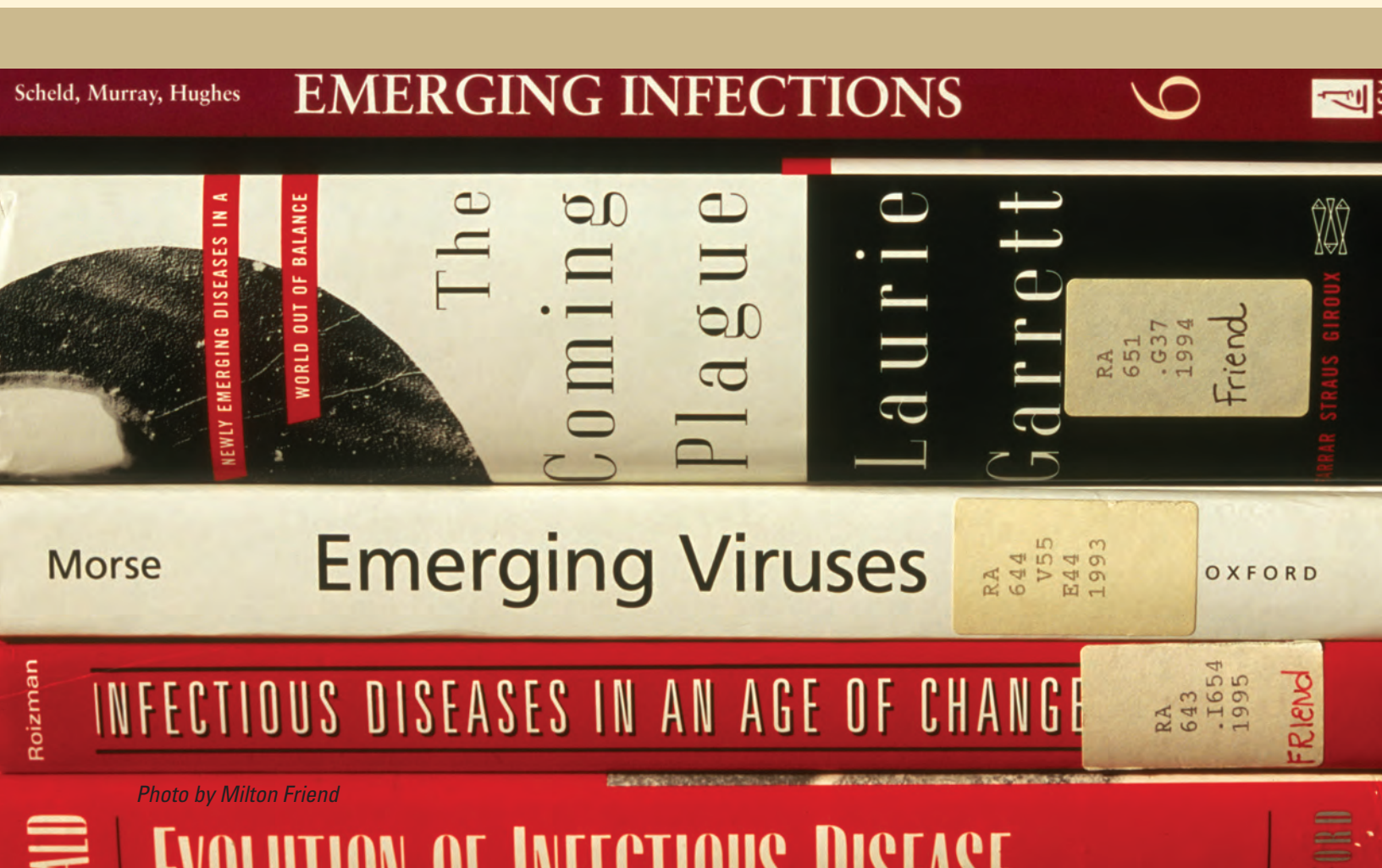


Photo by Milton Friend

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Bolded words within the text indicate terms that are defined in the Glossary.

Chapter 7

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During the last two decades of the 20th century, and continuing today, there has been a global emergence and resurgence of infectious disease of humans and other species. The “exotic” nature and serious consequences of many of these diseases results in media attention and public interest, in addition to the scientific exploration and efforts associated with combating these diseases. Finding and accessing information about diseases and keeping informed about current events and new discoveries is a daunting task because of the diversity of information sources and the great volume of published materials. This chapter provides guidance for effectively traveling the information highway and efficiently negotiating the information maze.

Information and More Information

Technological advances have provided access to enormous information resources. Consider this scenario: In 1968, a British librarian researched the topic of bubonic plague to illustrate how reference work was done. He did this research by using specialized paper indexes in one library and identified 14 books, which he used as a starting point for his research. These books provided sufficient leads to allow the researcher to adequately compile resources and publish a small book titled *The Black Death* that depicted plague events in Europe between the 14th and 17th centuries.²

A similar search was done in 2004, with the use of readily available electronic resources. The term “plague” was entered into an Internet **search engine** and the search netted nearly 2 million results (also referred to as hits). The search for “black death” resulted in over 7 million hits. A “Bubonic plague” search resulted in the fewest at 72,000. Results that number in the thousands and millions may seem unmanageable, but there are ways to focus a search to get the most useful material. In this chapter, emerging infectious diseases, primarily zoonoses and other diseases affecting wildlife, are the topics used for illustrating information pathways. General strategies for negotiating the information maze are also provided. Although primarily intended for those unfamiliar with how to find and access information, this chapter may also benefit those unfamiliar with the literature on zoonoses and on wildlife disease.

Traversing the Information Maze

In this chapter, the subject is approached by taking the reader on two journeys into the information maze (Fig. 7.1). The first journey highlights the evolution in content of the scientific literature and includes major information sources addressing zoonoses and wildlife diseases. The second journey is more extensive and identifies the primary types of information sources available, methods for identifying and acquiring specific information, and strategies for monitoring information sources for new developments. The examples provided in the tables focus on zoonoses and other diseases of wildlife, but are representative of the general types of information sources available. They do not constitute comprehensive coverage for specific subject areas. Nevertheless, these examples provide primary access to the abundant information available within the general area of emerging infectious diseases.



Illustration by John M. Evans

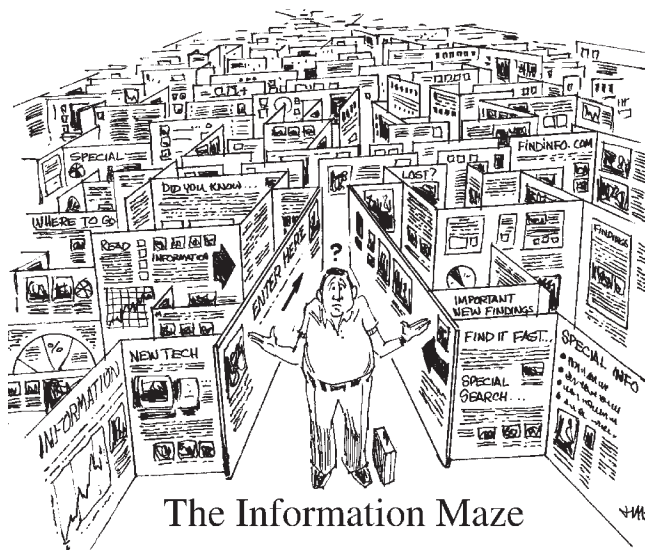


Figure 7.1 Navigating the information maze is a daunting task that requires pretravel planning for a successful journey.

Information Transitions

Today, an increasing amount of information is provided electronically through computer technology. Major scientific journals publish on-line, and various Web sites provide nearly instant postings of information on current disease events. Just as information formats change over time, so does the content of information typically found in scientific publications. Advancement of scientific knowledge has increased the rigor of how science is conducted and, along with competition for journal space and publication costs, has adjusted what type of information appears in peer-reviewed scientific publications. The richness and robustness of information published today differs greatly from that of past centuries. For example, the advanced technology and knowledge of current times allows highly sophisticated investigations, a great deal of control over experimental conditions, and complex statistical and mathematical evaluations of findings. However, while the associated publications may be rich in technical detail and scientifically robust, some aspects of these publications often have less “richness” than historic publications (Box 7.1).

New information about a subject over time reflects advances in knowledge; however, increases in knowledge do not necessarily translate to increases in wisdom. For example, about 2,400 years ago, Hippocrates (c. 400 B.C.) displayed great wisdom about the relations between landscape and disease in humans (environmental or ecosystem health) in his writing “On Airs, Waters, and Places” (see Chapter 1),

even though the “germ theory” would not be scientifically proposed until the 1860s. Much can be learned by revisiting the historic literature in addition to reviewing current knowledge, and such excursions often are more rewarding than might be expected. For instance, a wealth of early information about disease outbreaks in animals can be found in two summaries, *Animal Plagues*³ and *History of Animal Plagues of North America*,⁴ published in the late 19th century and just prior to World War II, respectively. The latter is a publication that the U.S. Department of Agriculture republished 35 years later because of its value.

Increases in scientific knowledge have been accompanied by a continuum of specialized focus areas within the broader areas of health and disease. This specialization results in discrete bodies of literature embedded within those broader areas. For example, many emerging infectious diseases are zoonoses, and many of these are associated with wildlife (see Chapter 2). The **etiologic** agents involved are focus areas for specialists in the fields of bacteriology, virology, parasitology, immunology, epidemiology, and other disciplines, in addition to specialists pursuing the ecology and control of these diseases in humans, domestic animals, and wildlife. Therefore, the connectivity among related areas of literature is highlighted here to assist in the quest for information.

Infectious Disease Through the Ages

Infectious disease has existed as a human malady throughout human history. Descriptions and accounts of infectious disease have been extracted from archeological studies, historical writings, and even from fossilized skeletal remains.^{5,6} Zoonoses, such as rabies, have been prominent among the earliest known infectious diseases.^{7,8} Highlighted here are some of our choices for books addressing infectious disease through the ages (Table 7.1). In doing so, our primary focus is on broad-based publications rather than hallmarks of discovery or individual diseases. The history of infectious disease is not addressed here, as this has been done by others.^{3,4,9,10–13}

Zoonoses

Publications about the relation between infectious diseases of animals and humans have surfaced over time (Table 7.1); however, by the late 1920s, zoonoses became an increasing focus for study. At that time, sufficient understanding of these relations existed and books on zoonoses began to appear, even though the term was not coined and defined until later.¹⁴ Since then, zoonoses have become a specific area for investigation within the broader area of infectious disease. A substantial and ever increasing body of literature exists

Table 7.1 Selected books on infectious disease (pre-1980).

Title	Date first published	Comments
Animal Plagues ³	1871	Reports the history of animal diseases from 1490 B.C. to the beginning of the 19 th century.
Tropical Diseases ⁴⁷	1898	A “classic” early publication by a physician-scientist who in 1913 was formally acclaimed “The Father of Tropical Medicine.” This manual on tropical diseases deals with a broad spectrum of human health issues and was intended as a practical reference for those traveling or living in tropical areas.
The Grouse in Health and in Disease ⁴⁸	1912	A classic early investigation into the causes of mortality in red grouse and the determination that the nematode <i>Trichostrongylus</i> spp. is a major factor; 2 volumes.
Rats, Lice, and History ⁴⁹	1935	A historical account and classic study of typhus in regard to the organism’s impact upon humans and the response of modern medicine; a biography of disease as seen by the organism.
Natural History of Infectious Disease ⁵⁰	1940	General presentation about infectious diseases. Offers intriguing facts and ideas along with biological descriptions written to appeal to laymen, scientists, and physicians with an interest in this topic. Revised editions in 1953, 1962, and 1972.
World-Atlas of Epidemic Diseases Vol.1–3 ⁵¹	1952–1961	An atlas of oversized, worldwide maps showing the distribution of epidemics. The text explores relationships in time and place between disease prevalence, spread, and geographical features. Written in German and English.
Mirage of Health ⁵²	1959	A historical account of the human struggle against disease from a perspective of “Utopias, Progress, and Biological Change.”
Myxomatosis ⁵³	1965	A classic study in the evolution of host-parasite relations following the introduction of <i>Myxoma</i> virus to infect European rabbits in Australia.
Natural Nidality of Transmissible Diseases ⁵⁴	1966	A 1964 Russian publication translated to English that advanced Pavlovsky’s “doctrine” of natural nidality of disease; that is, that certain diseases occur naturally in wildlife and are transmitted to humans by arthropods when humans enter the territory of wildlife.
The Biology of Animal Viruses ⁵⁵	1968	A comprehensive description of broad biological principles of viruses of warm-blooded vertebrates that builds upon <i>Principles of Animal Virology</i> . ⁵⁶ Revised in 1974.
Plagues and Peoples ¹³	1976	Explores the shifting balance between human hosts and infectious organisms. A “classic” and often cited book most recently reissued in 1998 with a new preface.
Zoonoses and the Origins of Ecology of Human Disease ⁵	1978	Builds upon established zoonotic literature by examining how human relationship to the environment effects disease patterns.

Box 7-1 Transitions in the Reporting of Science

“...modern scientific writing is quite unlike that of the past. Pressed into a ‘conventional format’, the scientific article of today is deprived of all subjective elements, stripped of all that is extraneous to the conclusions reached, and shorn of the human activity underlying the conclusions it presents” (Holmes).³⁶

The style and content of scientific articles have changed over time; many scientific investigators may not give much thought to these changes. Nevertheless, these changes reflect editorial practices and the scientific community standards that affect what does and does not get published. Conventions that have evolved for presenting scientific information are valuable for helping readers screen the increasing volume of available information. However, these conventions are not without information costs and raise questions related to motives underlying those changes. The rhetoric of science both informs and structures the scientific process itself,³⁷ thereby restricting the type of information provided and approaches to scientific inquiry. Some contend that the standards for presenting arguments and conclusions for scientific information (rhetoric) have bearing on the soundness of scientific writing.³⁸ Therefore, changes in scientific reporting are not only of interest to historians and literary scholars, but also to working scientists.

Evolution of the Science Article

The modern journal article has evolved from a form that emerged during the late 17th and early 18th centuries, along with the “learned” journal, as the forum for reporting scientific investigations.³⁶ Some evaluators contend that the current style for scientific writing equates to “literary Novocain,”³⁹ as it is devoid of the spontaneity characteristic of earlier scientific writing.³⁶ Early scientific writing usually included “...something about the nature of scientific endeavor—its difficulties, the prospects for failure and the flexibility necessary to do scientific work.”³⁹ Today’s scientific article is far more “crisp” in presentation. As a result, “...some of the range of expression allowable in the scientific writing of the past finds no place in the specialized scientific literature of today...”^{36,38} Despite less scientific rigor, the “ancillary” information common to earlier presentations often enhanced the “richness” of those presentations, and they may contain important observations and perspectives worthy for further investigation.

The scientific article is not a static means “...for communicating the conceptual system of science and, in the case of argument, is a developing means for creating that system.” Despite its changing nature, it is “...the canonical form for the communication of original scientific results.”³⁸ Contemporary scientific articles are expected to state a problem, present evidence, weigh supporting or conflicting evidence, and reach a conclusion.³⁶ Transitions over time, in format and content, reflect external changes associated with styles of thinking and making decisions that occur within any society or culture.^{40,41} Style, presentation, and argument for the purpose of analysis are the primary aspects of this system. These components have associated standards that have evolved over time in response to selective pressures for change (Fig. A).

During the late 17th and early 18th centuries, scientists used detailed narrative accounts of scientific investigations and observations to attain “authority” for their assertions. These accounts often contained extensive details of time, place, and other supplementary information to convince the reader that the events described and conclusions drawn represented real

and faithful reporting.³⁶ The use of scientific terminology was minimal, little quantitative data was provided, and the narrative approach for argument commonly used analogies with common things that most people could visualize. Also, these reports were intended for a diverse audience of amateurs and some professionals, rather than the audiences currently targeted, which consist almost exclusively of other professionals engaged in similar research.³⁸

In general, the substantial changes in the format and content of the scientific article have improved the conduct and the reporting of science. These changes “...favor a style that represents science as an objective enterprise, foster more efficient communication, and produce stronger, more flexible argument strategies”³⁸ (Table A). The advent of electronic publishing brings along other external factors.

Development of the Scientific Journal

The development and importance of “learned journals” was elevated by changes in world views fostered by the discoveries of new continents and observations about the natural world. The resulting information challenged the beliefs of learned people. For example, at the beginning of the 16th century, all scholars believed that all important truths and knowledge were contained in authoritative texts,⁴² but this viewpoint was discarded between 1550 and 1650 by most educated Europeans. This change was aided by Baconism (philosophy of Francis Bacon), a revolt against ancient authority by its advocacy for induction from facts as the basis for scientific investigation. In general, the advancement of science in England was fostered by the 1660 founding of the Royal Society to formulate the principles of doing science and shaping knowledge.⁴¹ “Learned journals” became the vehicle for advancing these goals.

The first “learned journals” reporting scientific inquiry were the French *Journal des Sçavans* (Journal of the Learned) and the British *Philosophical Transactions*. Both began publication in 1665, when science was a fledgling enterprise.³⁸ Philosophi-

Table A. General characteristics involving the style and content of the scientific article during earlier times (developed from Gross et al.³⁸).

17th Century	18th Century	19th Century	20th Century
<ul style="list-style-type: none"> • Mostly brief, observational reports of encounters with nature (biological and physical) • Baconian advocacy of induction from facts • Use of testimony and qualitative experience to establish authors' credibility • Scientific style changes from the occasionally and overtly social and personal to the mostly impersonal • Scientific style becomes more nominal (use of nounlike words) than verbal (use of words derived from a verb) • Sentence syntax (e.g., length and clausal density) becomes simple • Presentational features change from letter and news item format to include headings, figure captions, and introductions that provide context for article • Intended audience includes public as well as scientific peers • Hedging infrequent as claims are stated as fact 	<ul style="list-style-type: none"> • English, French, and German are the major languages of science 		<ul style="list-style-type: none"> • "Scientific English" becomes the international disclosure of science • Growth of format uniformity across national boundaries and disciplines • Focus readers' attention on issue rather than on the text itself or the authors • Relatively short, syntactically simple sentences • Technical abbreviations, quantitative expressions and equations, and citational traces • Intended audience almost exclusively other professionals engaged in similar research • Few sciences (e.g., plant and animal taxonomy) rely heavily on naked-eye observations to support claims; epistemic hedging common part of interpretation • Preference for comparison of large data sets • Mathematics/statistics applied whenever possible • Increasing visual content results in interpretation of figures and tables being important aspect of interpreting the findings

cal Transactions established a precedent in using rapid publication to provide credit for priority claims of new knowledge.⁴³ Science and Nature are prominent among current scientific journals that serve this purpose today, along with the numerous discipline-oriented journals and others that continue to emerge (see Fig. 7.2).

Perspective

Changes in scientific writing and presentation have become a focus for study, interpretation, and debate.^{37,38,44,45} Despite these transitions, "...the scientific article will remain the medium of choice for establishing new knowledge claims...."³⁸ Opinions such as the following, support that claim:

"Against widespread opinion to the contrary, we contend that the current scientific article is, on the whole, an

accurate reflection of the world as science conceives it, an effective means of securing the claims of science, and an efficient medium for communicating the knowledge it creates. Our conclusions thus challenge the critiques of stylistic 'purists' who insist that modern scientific prose is a communicative scandal."³⁸

Most important relative to the scientific article is the question of how scientists will cope with the never-ending stream of information. Will the volume of flow "...tempt scientists to narrow rather than broaden the scope of their reading, leading to a "balkanization of the global village"?"⁴⁶ This chapter provides suggestions to help scientists and others in developing strategies that enhance, rather than reduce, their ability to screen scientific information involving a broad spectrum of subject matter. Such strategies are important so that the knowledge gained through specialization remains connected with the broader areas of related science.

Table 7.2 Examples of general compendiums on zoonoses.

Title	Date first published	Comments
Major summaries		
Diseases of Animals in Relation to Man ¹⁵	1926	Informs public about diseases shared by humans and animals to promote healthy living conditions and to minimize transmission. Also, debunks common myths and fallacies.
Diseases Transmitted from Animals to Man ¹⁶	1930	First major summary of disease common to animals and humans. Prepared in part to encourage collaboration between veterinarians, physicians, laboratory researchers, and health officials to reduce disease transmission from animal to man. Revised editions were issued until 1975 (6 th edition) when there was a change of editorship to W.T. Hubbert et al.
Zoonoses ⁵⁷	1964	Summary presentation of zoonoses at the time that address the history, biology, and the importance of certain diseases.
Diseases of Man Acquired from his Pets ⁵⁸	1967	A guide to zoonotic diseases intended for students and practitioners, in both human and veterinary medicine. The chapters are organized according to the types of animals kept as pets, such as carnivores, birds, and ungulates.
Zoonoses of Primates: The Epidemiology and Ecology of Simian Diseases in Relation to Man ⁵⁹	1967	A collection of writings by world authorities selected to provide research workers and students a foundation of knowledge on which to build further research.
CRC Handbook Series in Zoonoses ^{17–20}	1979–1982	Published in three sections, each with multiple volumes and a fourth section addressing treatment; Section A: Bacterial, Rickettsial and Mycotic Diseases (2 volumes). Section B: Viral Zoonoses (2 volumes). Section C: Parasitic Zoonoses (3 volumes). Section D: addresses antibiotics, sulfonamides, and public health.
Zoonoses and Communicable Diseases Common to Man and Animals ²³	1980	Written for medical professionals, this comprehensive work has been updated and expanded with each edition. The third edition consists of three volumes.
Handbook of Zoonoses ^{21,22}	1994	Two volume revision of the CRC handbook series in zoonoses.
Zoonoses: Recognition, Control and Prevention ⁶¹	1995	Provides information about the field study of zoonoses, including historical background, current principles, predictions of future changes, and the present knowledge base in human and veterinary medicine.
Zoonoses: Biology, Clinical Practice, and Public Health Control ²⁴	1998	A medical textbook that describes zoonotic diseases, focusing on transmission, prevention, and treatment.
Dogs, Zoonoses, and Public Health ⁶²	2000	A diverse collection of works from different fields of study that provide a comprehensive examination of the human-dog relationship, ranging in topics from the human-dog bond to the major zoonotic diseases humans are exposed to by dogs.
Zoonoses: Infectious Diseases Transmissible from Animals to Humans ²⁵	2003	Based on the German edition first published under the title <i>Zoonosen: von Tier zu Mensch ubertragbare Infektionskrankheiten</i> in 1986 and in 1997; this 3 rd edition provides physicians and travelers concise presentations for well-known and rare zoonoses and other infectious diseases.

Table 7.2 Examples of general compendiums on zoonoses—Continued.

Title	Date first published	Comments
North American Parasitic Zoonoses ⁶³	2003	A brief summary of pertinent information on parasitic zoonotic diseases.
Waterborne Zoonoses: Identification, Causes, and Control ¹³⁸	2004	A comprehensive assessment of waterborne zoonoses that stresses the need for anticipating and controlling future emerging water-related diseases. Much of the emphasis is on diseases transmitted by domestic animals. Published on behalf of the World Health Organization and available at http://www.who.int/water_sanitation_health/diseases/zoonoses/en/
Outline presentations		
An Outline of the Zoonoses ⁶⁴	1981	Concise desktop reference to the zoonotic diseases that provides brief, basic information about diagnosis, treatment, transmission, prevention, and control.
Bacterial and Viral Zoonoses ¹⁴	1982	Summary report of a WHO Expert Committee that outlines the health and direct and indirect economic impact of bacterial and viral zoonoses.
The Zoonoses: Infections Transmitted from Animals to Man ⁶⁵	1988	A handbook providing a comprehensive list of over 100 zoonoses.
Veterinary Public Health Reports: Notes on the Role of Wildlife in the Epidemiology of Zoonoses ⁶⁶	1992	Provides guidance for assessing zoonotic transmission by local wild animals to humans in relation to the type of human activities within an area (e.g., dwelling, farming, tourism, and hunting).

under this designation, including a continuum of excellent books that synthesize available information about zoonoses (Table 7.2).

*Disease of Animals in Relation to Man*¹⁵ is considered a zoonoses literature milestone; it is an early book that focuses on infectious diseases common to humans and animals. That small book, published in the UK, was followed by *Diseases Transmitted from Animals to Man*,¹⁶ a USA publication that endured as a major reference for at least 50 years. Revisions published in 1941, 1947, 1955, 1963, and 1975 kept the contents current. The history, prevalence, causative agent, disease manifestations in animal and humans, and disease prevention are summarized and concisely presented. The first volume of the *CRC Handbook Series in Zoonoses*,¹⁷ published in 1979 and completed in 1982,^{18–20} set a new standard because of its comprehensive coverage of zoonotic diseases and its international authorship by recognized experts. The second edition of the CRC series has less detail than the original publications, but remains highly useful.^{21,22}

*Zoonoses and Communicable Diseases Common to Man and Animals*²³ (1980) is another important publication. This book includes symptoms, etiology, geographic distribution, disease occurrence in man and in animals, source of infection, mode of transmission, disease diagnosis, and control for 166 different zoonoses. Originally published as a single volume, the third edition requires three volumes. The recent

single-volume publications, *Zoonoses*²⁴ and *Zoonoses: Infectious Diseases Transmissible from Animals to Humans*²⁵ are other excellent books in this subject area (Table 7.2). These types of books are good starting points for delving into the literature on specific diseases. Greater detail is found in disease-specific monographs, books, and other publications (Table 7.3). Screening Web sites and high-profile weekly scientific journals provides a means to remain updated on research about diseases (Table 7.4).

Publication of the presentations from scientific symposiums and the annual meetings of professional societies is another important source of information on zoonoses and infectious disease (Table 7.5). Reports from annual meetings such as the U.S. Animal Health Association and the *Transactions of the North American Wildlife and Natural Resource Conference* typically contain presentations on current wildlife disease issues. Meetings about specific diseases often attract recognized authorities to address and debate that disease, and the resulting publications are often good sources of current knowledge. Examples include the periodic conferences on avian influenza²⁶ and on rabies.^{27,28} Also, during recent years, popular literature and media have become important sources for information. Zoonoses are prominent among diseases that are often a focus in popular literature on emerging infections (Table 7.6).

Table 7.3 Examples of zoonoses-specific publications.

Title	Date first published	Comments
Rocky Mountain Spotted Fever ⁶⁷	1990	A history of this rickettsial disease during the 20 th century with retrospective evaluations for the 19 th century.
The Natural History of Rabies ⁷	1991	This is an update of the original 2 volume treatise originally published in 1975 that presents the history and ecology of this disease in animals and humans and fundamental aspects of the rabies virus including morphology, chemistry, physical makeup, and relationship to related viruses.
Human Schistosomiasis ⁶⁸	1993	Covers the complex immunological reactions, epidemiology and control, the parasite and the snail as intermediate host, as well as clinical aspects of the disease. This is the third summary of information that first appeared in 1969 under this same title, and then again in 1982 as <i>Schistosomiasis: Epidemiology, Treatment, and Control</i> .
Tuberculosis ⁶⁹	1994	A comprehensive review of human tuberculosis (<i>Mycobacterium tuberculosis</i>).
Giardia: From Molecules to Disease ⁷⁰	1994	A comprehensive review of this common waterborne protozoan disease of humans.
Echinococcus and Hydatid Disease ⁷¹	1994	A major publication addressing this important tapeworm of carnivores and often fatal infection in humans.
From Consumption to Tuberculosis: A Documentary History ⁷²	1994	A collection of papers written between 1850 and 1992 that document and interpret historic contests with human tuberculosis.
Brucellosis in the Greater Yellowstone Area ⁷³	1998	A publication by the National Research Council examining <i>Brucella abortus</i> infection, transmission, vaccination, and approaches to combating this disease in wildlife.
Mycobacterial infections in domestic and wild animals ⁷⁴	2001	OIE Scientific and Technical Review special issue that addresses bovine tuberculosis and associated <i>Mycobacterium</i> infections in wildlife and domestic animals and their relation to human infections.
Biology of Plagues ⁷⁵	2001	A historic, epidemiological, and social evaluation of bubonic plague events that have ravaged humankind.
Anthrax ⁷⁶	2002	A broad survey of the ecology, epidemiology, clinical manifestations, pathology, and bacteriology of anthrax.
Ebola and Marburg Viruses: A View of Infection Using Electron Microscopy ⁷⁷	2004	Consolidation of recent literature and personal studies to tell the story of filoviruses and how they invade and conquer their hosts.
Ebola and Marburg Viruses: Molecular and Cellular Biology ⁷⁸	2004	Summarization of advances in molecular and cellular biology of Marburg and Ebola viruses.

Table 7.4 Examples of information sources providing rapid reporting of outbreaks of zoonotic and other infectious diseases.

Information Source	Type	Comments
<i>Science</i>	Journal	Published weekly by the American Association for the Advancement of Science. Content includes news items, policy articles, and subject evaluations all written for general understanding and highly technical research articles and reports directed at subject matter specialists. Also available electronically at http://www.scienceonline.org/ .
<i>Nature</i>	Journal	Similar in content and frequency to <i>Science</i> . Published since 1869 by Macmillan Journals. Available electronically at http://www.nature.com/ .
<i>New England Journal of Medicine</i>	Journal	A long-standing, prestigious journal publishing a broad spectrum of papers addressing diseases affecting human health including emerging disease issues, such as SARS and monkeypox; published weekly.
<i>Science News</i>	Report	Published weekly for subscribers. Contains news items abstracted from journals such as <i>Science</i> and <i>Nature</i> , and from major newspapers.
<i>Morbidity and Mortality Weekly Report (MMWR)</i>	Report	Weekly reporting of specific diseases and other health concerns by state and territorial health departments and by the Centers for Disease Control (CDC); international events of importance are also reported. Available online at http://www.cdc.gov/mmwr/ .
Disease Information	Report	A weekly compilation of emergency messages and animal health follow-up reports provided to the Office International des Epizooties (OIE) by 166 member countries in order to inform the international community about significant epidemiological events; distributed every Friday afternoon to http://www.oie.int/eng/info/hebdo/A_INFO.HTM .
ProMed-mail	Report	The global electronic reporting system for outbreaks of emerging infectious diseases and toxins, a program of the International Society for Infectious Diseases. Available at http://www.promedmail.org/

Wildlife Disease Literature

Scientists have been investigating disease in free-ranging wildlife populations for many years, but wildlife disease has only recently become a topic that has generated its own body of literature. In 1951, the Wildlife Disease Association (WDA) formed and began to publish the *Journal of Wildlife Diseases* (originally called the *Bulletin of Wildlife Diseases*), the first journal addressing this topic. The WDA also sponsors an annual meeting, periodically sponsors international meetings, and publishes a quarterly newsletter, which contains reports of wildlife mortality. Familiarity with the wildlife disease literature is worthwhile because many zoonoses have wildlife origins, and an increasing number of diseases appearing in humans (e.g., AIDS, SARS, monkeypox, and others)

involve agents with wildlife origins. A substantial number of noteworthy wildlife disease publications exist despite the recent origin of this field and relatively small number of investigators involved. Table 7.7 lists some of these publications. Entering the names of some contributors to these publications into search engines can provide a gateway to many other important scientific publications.

The first of a benchmark series of books on diseases of wildlife appeared in 1970 with the publication of *Infectious Diseases of Wild Mammals*²⁹ and was followed by *Parasitic Diseases of Wild Mammals*,³⁰ *Infectious and Parasitic Diseases of Wild Birds*,³¹ and *Noninfectious Diseases of Wildlife*.³² These publications provided the most comprehensive coverage up to that time of diseases affecting free-ranging

Table 7.5 Examples of zoonoses and other infectious disease information sources associated with scientific symposia, conferences, and meetings.

Title	Date first published	Format	Comments
Psittacosis ⁷⁹	1955	Book	Proceedings of a symposium. Papers provide state of knowledge for that time.
Animal Disease and Human Health ⁸⁹	1958	Journal	A New York Academy of Sciences monograph addressing a comparative medicine conference that provides a 10-year progress report on zoonoses of concern.
Newcastle Disease Virus: An Evolving Pathogen ⁸⁰	1964	Book	Symposium proceedings with papers by leading experts of different disciplines from around the world; clearly provides state of knowledge at that time.
Rabies ²⁷	1971	Book	Proceedings of Working Conference on Rabies sponsored by the Japan-United States Cooperative Medical Science Program. Internationally recognized experts in this disease provide state of knowledge along with summaries of rabies in Asia, Japan, and the Philippines.
Wildlife Diseases ⁸¹	1976	Book	Proceedings of the Third International Wildlife Disease Conference; papers by internationally known wildlife disease specialists.
Wildlife Diseases of the Pacific Basin and Other Countries ⁸²	1981	Book	Proceedings of the 4 th International Conference of the Wildlife Disease Association.
Rabies in Europe ²⁸	1989	Report series	Collection of papers from the Second Joint Meeting on Rabies Control in Europe; updates the findings from the First Joint Meeting (1985).
Bovine Tuberculosis in Cervidae: Proceedings of a Symposium ⁸⁶	1992	Agency publication	Proceedings from a conference to formulate recommendations for dealing with disease emergence in captive deer and elk; published by USDA.
Implications of Infectious Disease for Captive Propagation and Reintroduction of Threatened Species ⁹⁰	1993	Journal	Proceeding papers from an international conference with a focus on how to develop and implement disease prevention for the well-being of free-ranging wildlife populations.
Ecology of Infectious Diseases in Natural Populations ⁸³	1995	Book	Developed from a 1993 Isaac Newton Institute workshop on epidemic models to focus on disease in natural systems (fauna); largely mathematical evaluations.
Infectious Diseases in An Age of Change ⁸⁴	1995	Book	Developed from a Natural Academy of Sciences' colloquium entitled "Changes in Human Ecology and Behavior: Effects on Infectious Diseases."
Brucellosis, Bison, Elk, and Cattle in the Greater Yellowstone Area: Defining the Problem, Exploring Solutions ⁸⁷	1997	Agency publication	Papers presented at a national symposium sponsored by the Greater Yellowstone Interagency Brucellosis Committee.
Public Health Systems and Emerging Infections ⁸⁸	2000	Independent publication	Summaries of presentations from a Workshop of the Forum on Emerging Infections. Published by the National Academy of Sciences.
Proceedings of the Fifth International Symposium On Avian Influenza ²⁶	2003	Technical society publication	One of a continuing series of proceedings of meetings of international experts in influenza providing state of knowledge of this disease.
Coral Health and Disease	2004	Book	A comprehensive global evaluation of emerging disease in coral reef systems; derived from an international meeting held in Eilat, Israel, April 2003.

Table 7.6 Examples of recent popular literature focused on emerging infectious diseases.

Title	Year of publication	Comments
The Restless Tide: The Persistent Challenge of the Microbial World ¹⁴⁰	1981	A series of essays about the challenges microbes pose for human health. This book is of special interest because it was published at a time when it was believed that the era of infectious diseases in humans was ending.
Disease for Our Future ⁹¹	1989	A <i>BioScience</i> article highlighting the outcome from discussions and presentations from among 200 scientists attending a workshop focused on emerging viral diseases.
The Coming Plague: Newly Emerging Diseases in a World out of Balance ⁹²	1994	A highly readable account of the emergence of several high profile diseases such as AIDS and Ebola fever; author was awarded a Pulitzer prize for this book.
The Killers All Around ⁹³	1994	Illustrated article in <i>Time</i> magazine helped bring the issue of infectious disease emergence before the general public.
The Emergence of New Diseases ⁹⁴	1994	A good overview of global disease emergence and resurgence prepared by several members of the Harvard University Working Group on New and Resurgent Diseases; published in <i>American Scientist</i> .
The Hot Zone ⁹⁵	1995	Story of Ebola fever; adapted for the movie, <i>Outbreak</i> .
Biohazard, the Hot Zone and Beyond: Mankind's Battle Against Deadly Disease ⁹⁶	1997	Examines the rise in resistant diseases and speculates on humanity's chances for survival against them.
Virus X: Tracking the New Killer Plagues: Out of the Present and Into the Future ⁹⁷	1997	Presents a radical theory about the origin of deadly microbes and discusses past outbreaks and the dangerous work researchers are conducting in attempts to prevent them.
Guns, Germs, and Steel ⁹⁸	1998	A popular book exploring disease in humans over the last 13,000 years and the affects of widespread pathogens.
Outbreak Alert: Responding to the Increasing Threat of Infectious Diseases ⁹⁹	2000	A layman's guide about infectious diseases and how to minimize exposure; past outbreaks are used to provide context.
Bioinvasion ¹⁰⁰	2000	<i>Business Week</i> article that focuses on the global movement of disease as a by-product of travel and commerce and the economic consequences associated with disease introductions.
Killer Germs: Rogue Diseases of the Twenty-First Century ¹⁰¹	2001	Analyses the impacts of infectious disease during the 20 th century; also explores the potential use of disease as a biological weapon.
The New Killer Diseases ¹⁰²	2003	Presents high profile diseases such as SARS and reviews what is being done about them.
Six Modern Plagues and How We Are Causing them ¹³⁷	2003	Focuses on mad cow disease, AIDS, salmonella DT104, Lyme disease, hantavirus, and West Nile virus. Connects these health risks and their ecological origins.
Dinner, Pets, and Plagues by the Bucketful ¹⁰³	2004	Article in <i>The Scientist</i> that is focused on the wild animal trade as a source of pathogen introductions.

Table 7.7 Examples of books primarily focused on disease in free-ranging wildlife.

Title	Date first published	Comments
General publications		
Parasites of North American Fishes ¹⁰⁴	1967	An illustrated key with descriptive information about this group of parasites; a major work of its time.
Infectious Diseases of Wild Mammals ²⁹	1970	First in a series of books published by Iowa State University Press summarizing information about disease in free-ranging wild mammal populations. A benchmark publication prepared by wildlife disease specialists. An expanded and updated 3 rd edition published in 2001 is edited by Williams and Barker.
Parasitic Diseases of Wild Mammals ³⁰	1971	Another in the series published by Iowa State University Press, an expanded and updated 2 nd edition was published in 2001 under the editorship of Samuel et al.
Infectious and Parasitic Diseases of Wild Birds ³¹	1971	Publication of a revised edition of this component of the original set of four books developed under the guidance of J.W. Davis is pending; separate volumes for infectious diseases and for parasites will be published under the editorship of Thomas et al.
Diseases of the Reptilia ¹⁰⁵	1981	Volume 1 covers infectious diseases and Volume 2, non-infectious diseases. This was the first book on this subject written by specialists in diseases of reptiles and provides a good baseline for comparative evaluations.
Diseases and Parasites of White-tailed Deer ¹⁰⁶	1981	Compendium about diseases and parasites of one of North America's most important and favorite game species.
Noninfectious Diseases of Wildlife ¹⁰⁷	1982	A 2 nd edition of was published in 1999 under the editorship of Fairbrother et al.; focus is on environmental contaminants, lead poisoning, mycotoxins, and other non-infectious sources of disease.
Diseases of Amphibians and Reptiles ¹⁰⁸	1984	Infectious and noninfectious diseases of free-ranging and captive "herp-tiles"; primarily organized by disease.
Investigation and Management of Disease in Wild Animals ¹⁰⁹	1994	First book devoted to the control and management of disease in free-ranging wildlife populations. The author has a great deal of practical experience provided by his role as Director of the Canadian Wild Animal Disease Centre.
Fish Diseases and Disorders ^{110–112}	1995–1999	A three volume set: Vol. 1, <i>Protozoan and Metazoan Infection</i> , Vol. 2, <i>Non-infectious disorders</i> , and Vol. 3, <i>Viral, Bacterial, and Fungal Infections</i> providing comprehensive coverage of the biology and ecology for the diseases addressed.
Handbook of Trout and Salmon Diseases ¹¹³	1997	Third edition of a well-illustrated publication initially intended as a guide for trout and salmon farmers in the 1970s.
Diseases of Wild Waterfowl ¹¹⁴	1997	First published in 1981, the updated and expanded 2 nd edition remains an important standard reference for obtaining information about the diseases of free-ranging waterfowl.
Fish Disease Diagnosis and Treatment ¹¹⁵	2000	Highly illustrated guide addressing the diagnostic methods and treatment of fish diseases.
Amphibian medicine and captive husbandry ¹¹⁶	2001	Addresses amphibian medicine and captive husbandry; includes a focus on the pathology of diseases of amphibians.
Diseases of Marine Mammals ¹¹⁷	2001	The 2 nd edition is a comprehensive assembly of diseases affecting this group of species; an important standard reference for anyone with interests involving diseases in marine mammals.

Table 7.7 Examples of books primarily focused on disease in free-ranging wildlife—Continued.

Title	Date first published	Comments
Infectious Diseases of Wildlife: Detection, Diagnosis and Management ¹¹⁸	2002	Two part Scientific and Technical Review of OIE addressing disease in farmed and free-ranging wildlife. High profile diseases of mammals are the primary orientation along with management of disease in wildlife.
Regional publications		
Diseases of Wildlife in Wyoming ¹³⁵	1956	An illustrated compendium of diseases and disease agents found in Wyoming wildlife and other disease agents of concern. Updated, expanded, and published in 1982 as a 2 nd edition edited by Thorne et al.
Alaskan Wildlife Diseases ¹¹⁹	1981	A compendium of diseases of Alaskan wildlife (including fish and invertebrates).
Parasites and Diseases of Wild Mammals in Florida ¹²⁰	1992	A thorough, comprehensive presentation of disease agents and conditions affecting Florida's mammalian wildlife. Presented by animal species and includes established introduced species (e.g., sambar deer) and feral species (e.g., wild hogs).
Parasites and Diseases of Wild Birds in Florida ¹²¹	2003	A complementary and equally thorough companion publication to the 1992 mammal publication. These two books provide a rare, in-depth assemblage of information about the diseases of wildlife within a single state and serves as an important baseline for disease investigations involving Florida wildlife.

wildlife. Subsequent editions for all but the wild bird volume have been updated. Additional publications that have since appeared further expand the sources of information (Table 7.7).

A number of field guides illustrating gross lesions associated with various diseases of wildlife also have been published (Table 7.8). Typically, a synopsis about each disease is included. More extensive information and illustrations are provided by the field guides published by the National Wildlife Health Center.^{33,34} Bibliographies on wildlife disease, scientific journals devoted to diseases of wildlife, and various special reports and conference proceedings add to the publications available. Newsletters prepared by several wildlife disease programs, such as the Southeastern Cooperative Wildlife Disease Study in Georgia and the Canadian Cooperative Wildlife Health Centre, and subscription-based wildlife health modules are also important data sources (Table 7.9). Other useful resources are the National Wildlife Health Center's Web site (<http://www.nwhc.usgs.gov>) and Wildpro[®] (<http://www.wildlifeinformation.org>), a fee-based electronic information system that includes wildlife disease modules, such as those for chronic wasting disease and West Nile virus. During recent years, the Paris-based Office International Des Epizooties (OIE) has become an important source addressing wildlife disease (<http://www.oie.int>) through their OIE Scientific and Technical Reviews. The orientations for these reviews, most of which provide an international perspective, are primarily the direct and indirect interactions between domestic animals and wildlife, and those between animals and humans.

Pathfinding

Finding and extracting the desired information from among the many sources is the next task in negotiating the information maze. Major libraries often provide a variety of tools to locate information. These tools include general and specialized guides to the scientific literature, guides called pathfinders that focus on a specific subject at a specific library, and reference books that explore the literature of a particular field.

Getting Started

Many university libraries offer excellent general discussions about their information resources and are a good starting point for information searches. For example, a basic guide to resources at the library homepage of the University of Illinois at Springfield (<http://library.uis.edu/findinfo/types.html>) provides the following suggestions for focusing a search. For:

- a brief summary or background information, try an encyclopedia;
- a comprehensive analysis of your topic, look for books;
- a detailed analysis on some aspect of your topic, look for articles;
- objective accounts of an event, look for newspaper articles;
- obscure or esoteric information or historic primary documents, look for Web sites.

Table 7.8 Examples of illustrated field guides on wildlife disease.

Title	Date first published	Comments
Manual of Common Parasites, Diseases and Anomalies of Wildlife in Ontario ¹²²	1964	Pocket-sized (6"x 8") ring binder intended to be taken into the field. Color photographs of gross lesions accompanied by brief description of the disease, 1 to 3 selected references for more detailed information, and a form for documenting occurrences of each disease. An expanded second edition was published in 1969.
Manual of Common Wildlife Diseases in Colorado ¹²³	1981	Similar size, and basic content as the Ontario and Southeastern U.S. manuals.
Handbook of Diseases of Saskatchewan Wildlife ¹²⁴	1985	Addresses causative agent, species affected, occurrence in Saskatchewan, general ecology, clinical disease, pathology, specimens for diagnosis, and general significance for wildlife. Color photographs illustrate each disease.
Field Guide to Wildlife Diseases—General Field Procedures and Diseases of Migratory Birds ³³	1987	A highly illustrated guide written for field biologists. Tables synopsise information. The most detailed presentation of information for any field guide previously published. The first part of the book addresses field procedures for combating disease. The remainder of the text is disease specific and addresses synonyms, cause, species affected, geographic distribution of disease, seasonality, field signs, gross lesions, diagnosis, control, and human health considerations.
Field Manual of Wildlife Diseases in the Southeastern United States ¹²⁵	1988	Information is arranged by species and then disease. Color photographs illustrate the disease condition/parasite. Information is arranged by causative agent, clinical signs, lesions, hosts, diagnosis, ecology, wildlife management significance, and public health implications. An expanded second edition was published in 1997.
Field Manual of Wildlife Diseases—General Field Procedures and Diseases of Birds ³⁴	1999	An expanded revision of the 1987 Field Guide to incorporate additional diseases. Basic format and type of information presented is similar to the 1987 Field Guide; available on-line at http://www/nwhc.usgs.gov/

Once initial needs are determined, certain strategies can be applied to each information source in order to retrieve the most useful items in each category. A variety of guides exist to help direct searchers to appropriate information; one example is a "pathfinder." Basically, pathfinders define a subject and then systematically list all the resources in the library that fall into that category. The University of Guelph has posted an excellent pathfinder that deals with diseases of wildlife: <http://www2.uoguelph.ca/library/lib/pathfinder/index.cfm?code=wzdiseases>. When available, pathfinders are recommended for initial searches because their listings often include information resources previously unknown to those conducting the search. Pathfinders are limited in that they only direct the searcher to items held by one particular library.

Other useful literature guides are compiled to direct searchers to primary and secondary resources. For example, the library at the University of Illinois, Urbana-Champaign developed *Using the Biological Literature: A Practical Guide*,³⁵ which evolved from a series of handouts prepared for biology students and covers over 3,000 major books,

journals, and biology-related Web sites. It does not specifically cover applied sciences, such as medicine or veterinary medicine; however, it covers basic foundations of biology such as taxonomy, ecology, animal behavior, and many other areas of interest to biologists. Further, the authors comment on the constantly changing nature of the electronic literature and have extracted the entire set of Web resources listed in the guide and posted them at: <http://door.library.uiuc.edu/bix/biologicalliterature/> (updated regularly).

Search Methods

Books

A basic method for compiling a knowledge base on a subject is to begin with books. The presentation of the material can range from brief information found in dictionaries and encyclopedias to extensive coverage of a single subject, typical of a monograph.

Encyclopedias and handbooks (e.g., *The Merck Veterinary Manual*, also online at <http://www.merckvetmanual.com>) can be used to find basic information. Bibliographies often

appear in book form. Sometimes they include abstracts, but mostly they function to point the reader to a listing of works on a particular subject. The most authoritative works are monographs, which attempt to systematically and completely cover a subject area.³

The library catalog, the traditional library tool used to find books, is a listing of every book owned by a particular library. Prior to the Internet, one had to actually be at the library to search a catalog. Now many catalogs for university libraries are accessible via the Web. More productive searches will result from libraries at universities that have strong academic programs in the subject area of interest and from specialty libraries, such as the National Library of Medicine. Library catalogs can be checked routinely for new titles. A method to remain current on books about zoonoses might involve accessing a university's on-line catalog and routinely entering applicable search terms. Search engines have a limiting capacity in regard to publication date, so it is easy to see which books have been recently published.

In electronic library catalogs, search engines often provide for a subject search along with author, title, or keyword searches. Including subject headings from the Library of Congress that correspond to the subject area can facilitate searching electronic library catalogs. When the exact subject headings from the Library of Congress are entered, a listing of every item that contains that subject matter is listed. "Zoonoses" has been designated as a subject heading in the Library of Congress, and using this keyword will retrieve a comprehensive listing of materials. The use of specific keywords, such as tularemia or rabies, may narrow the list, but the use of a designated heading will provide the broadest approach possible to the topic.

Another search option available at many university and public libraries is called *WorldCat*, a catalog of more than 56 million books, serials, audiovisual media, maps, archives, manuscripts, scores, and computer files owned by more than 9,000 member libraries around the world. Database searching was previously limited to member libraries, but now *WorldCat* records are accessible through common search engines and through selected on-line booksellers (e.g., BookPage.com, ABE Books, Alibris for Libraries, and the Antiquarian Booksellers' Association of America). Search results include how to locate libraries that own the desired material.

Publishers' catalogs of recent and forthcoming titles provide information on new publications. These catalogs may be requested on a regular basis from publishing companies or may be accessed on-line at the publishers' Web sites. A few examples of scientific publishing houses are Blackwell, Springer-Verlag, Elsevier, Saunders, CABI, OIE, and the Iowa State Press. Searchers can also peruse catalogs of Internet booksellers. New books are often listed with a table of contents and may include a sample chapter.

Journals (Periodicals)

Scientific journals are another important source of information and are typically more current than books. Journals often take the form of a periodical, which contains news, proceedings, transactions, and reports of work carried out in a particular field. The number of journals in which information on zoonoses and other infectious diseases can be found continues to expand. For example, a database tally of periodicals publishing papers on communicable diseases disclosed 32 records (18 in English) during 1940 to 1949 and 199 (172 in English) during 1990 to 1999 (Fig. 7.2). Many current journals (Table 7.10) also publish on-line and can be screened as each volume is published, but a more effective way is to search their contents through an abstracting and indexing service.

Abstracting and Indexing Services

Whereas library catalogs are used to identify sources of published information, titles of journal articles and conference proceedings are compiled by indexing and abstracting services. Some of these services are available for free (usually as a government service) and others are fee-based. An indexing service provides only basic information, such as journal name, volume, date, author, and title, along with keywords and subject headings. An abstracting service provides this information plus a brief summary of the content of the article. Many of these services specialize in a variety of fields, including medical, veterinary, and wildlife sciences. The primary products of these services are title listings. For the full text, the article might be obtained through interlibrary loan, as a reprint from the author, through a document delivery service, or from the Internet.

Keywords are a prime portal for finding information. A thesaurus can be helpful for finding search terms. Some common keywords for the topic of zoonoses are zoonotic disease and animals and public health. Also, specific zoonotic diseases, such as tularemia and rabies, can be used as search terms, alone or in combination with another term. For example, a search for information about tularemia in rabbits may be aided by keywords defining the causative agent (*Francisella tularensis*) and the host species (e.g., *Sylvilagus floridanus* and *Lepus californicus*).

Free on-line databases that can be accessed through the Internet include PubMed, Agricola, and Ingenta (Table 7.11). These sources can be used as a starting point to become familiar with on-line databases. A useful database for searching zoonotic literature is PubMed, which is the version of Medline available to the general public. This service provides access to over 12 million Medline citations, some beginning in the early 1960s. The National Library of Medicine produced the broad range of citations for Medline from over 4,500 different biomedical journals. The National Agricul-

Table 7.9 Examples of other types of special publications focused on wildlife diseases.

Title	Source	Comments
Journal of Wildlife Diseases	Wildlife Disease Association	Papers on all aspects of disease and health associated with the survival of free-living or captive populations of wild animals, including fish; published quarterly.
Journal of Zoo and Wildlife Medicine	American Association of Zoo Veterinarians	Papers on research findings, clinical observation, case reports in the field of veterinary medicine dealing with captive and free-ranging wild animals; published quarterly.
Journal of Fish Diseases	Blackwell Science Ltd	Information on original research into all aspects of disease in both wild and cultured fish and shellfish; international scope and published quarterly.
Journal of Aquatic Animal Health	American Fisheries Society	Published under the guidance of the American Fisheries Society's Fish Health Section. An international journal, published quarterly that focuses on papers addressing the causes, effects, treatments, and prevention of diseases of marine and freshwater organisms, particularly fish and shellfish.
Diseases of Aquatic Organisms	Inter-Research	Research articles, reviews, notes, and other information about health issues associated with all forms of life (animal, plant, microorganisms) in marine, limnetic, and brackish habitats.
SCWDS Briefs	Southeastern Cooperative Wildlife Disease Study (SCWDS)	Quarterly newsletter providing information on current issues involving diseases of wildlife and SCWDS activities.
Canadian Cooperative Wildlife Health Centre Newsletter (CCWHC)	CCWHC	Quarterly newsletter providing information on current issues involving diseases of wildlife and CCWDS activities.
Quarterly Wildlife Mortality Report	National Wildlife Health Center (NWHC)	This report compiles North American Wildlife mortality events and appears within the larger <i>Supplement to the Journal of Wildlife Diseases</i> issued with the Journal and is also posted on the National Wildlife Health Center Web site (http://www.nwhc.usgs.gov).
A Bibliography of References to Diseases of Wild Mammals and Birds ¹²⁶	American Veterinary Medical Association	A 1955 compilation of the literature in this subject area published as Part 2 of Volume 16 of the American Journal of Veterinary Research. An important reference for access to earlier scientific literature on diseases of wildlife.
Avian Cholera and Related Topics: An Annotated Bibliography ¹²⁷	NWHC	A 1988 updating of the 1979 bibliography on this subject by Wilson and Jensen, containing 1,416 references of this important disease of wild birds and some other species.
A Partial Bibliography on Duck Plague ¹²⁸	Unpublished NWHC Internal Report	Developed shortly after duck plague erupted for the first time in wild waterfowl in the USA, this internally produced bibliography helped to focus scientific investigations by scientists within the U.S. Fish and Wildlife Service.
Annotated Bibliography of Helminthes of Waterfowl ¹²⁹	Bureau of Sport Fisheries and Wildlife (now the U.S. Fish and Wildlife Service)	A compilation of the world literature that remains as a valuable reference despite its 1969 publication as a Special Scientific Report of the Bureau of Sport Fisheries and Wildlife (now the U.S. Fish and Wildlife Service).
A Partly Annotated Bibliography on Infections, Parasites, and Diseases of African Wild Animals ¹³⁰	Kenyan International Development Research Centre	Because of the close interface between African wildlife and livestock, diseases shared between these species have economic consequences for both. This bibliography was developed to bring together literature citations of benefit for combating these diseases.

Table 7.9 Examples of other types of special publications focused on wildlife diseases—Continued.

Title	Source	Comments
Bibliography of Ticks and Tickborne Diseases: From Homer (about 800 B.C.) to 31 December 1984 ¹³⁶	United States Naval Medical Research Unit Number Three	A bibliography compiled by Harry Hoogstrall which covers historical papers on tickborne diseases many of which are transported by migrating birds.
Steel Shot and Lead Poisoning in Waterfowl: An Annotated Bibliography of Research ¹³¹	Natural Wildlife Federation	A compilation of literature associated with lead shot poisoning and alternative shot shell types for addressing this issue.
Bibliography of References To Avian Botulism: Update ¹³²	NWHC	An update of the 1977 bibliography published by Allen and Wilson in response to a high volume of requests to the Fish and Wildlife Service's Bear River Research Station for information on avian botulism. In general, citations are primarily focused on avian botulism as a disease, not on the biology of <i>Clostridium botulinum</i> .
Zoo and Wild Animal Medicine ¹³³	W.B. Saunders Co.	A highly useful, long-standing textbook developed for veterinarians and first published in 1978; the 2003 edition covers the diagnosis and treatment of zoo and exotic wildlife including their husbandry, maintenance, and diseases.
Use of Lead Shot for Hunting Migratory Birds in the United States ¹³⁴	U.S. Fish and Wildlife Service	Final Supplemental Environmental Impact Statement providing data on lead poisonings in waterfowl, alternative shot shell types, comments received, and other insights into this issue; also contains extensive literature citations.
WildPro®	Wildlife Information Network	A fee-based electronic program providing information on the natural history, husbandry, and management of captive and free-ranging wild animals, including their diseases. Full texts of various guidelines, books, manuals, and documents are components of this electronic encyclopedia and library for wildlife, as are comprehensive, subject specific modules.

tural Library produces the database Agricola. Agricola is a bibliographic database of agricultural literature citations that contains references from the 1970s to the present. The subject area covers all aspects of agriculture, including animal and veterinary sciences, so zoonotic diseases are also included.

Another way to identify new articles is to browse through the table of contents of recent journals. Ingenta (www.ingenta.com) is a company that provides a way to do this for free, although a fee is charged if the entire article is needed. Users can search Ingenta by recent table of contents or by subject. This database only covers materials published since 1997.

Universities and research agencies often purchase licenses that allow users free access to fee-based databases (Table 7.12). These are also available to individuals privately, but in most cases the costs are prohibitive. Many fee-based databases can be used to identify articles on the topic of wildlife and zoonotic diseases. Some examples include *Wildlife and Ecology Worldwide*, *Biological Abstracts*, and *Zoological*

Record (the latter two are provided by BIOSIS, an information service company).

Wildlife and Ecology Worldwide is a compilation of extensive citations from scientific literature related to information on wildlife. The print version, known as *Wildlife Review*, was started in 1935 for the benefit of the U.S. Bureau of Biological Survey and continued under the stewardship of the U.S. Fish and Wildlife Service until 1995. This service has been privatized and is currently offered by the National Information Services Corporation (NISC). Major topic areas include studies of individual species, habitat types, hunting, economics, wildlife behavior, management techniques, diseases, parasites, and others.

Biological Abstracts provides comprehensive coverage of resources worldwide in the biological and biomedical sciences. *Zoological Record* focuses on zoological literature. With coverage extending back to 1874, *Zoological Record* is the oldest continuing database covering publications on animal biology. The emphasis is on systematic/taxonomic

Table 7.10 Other examples (in addition to those in other chapter tables) of journals commonly publishing scientific papers addressing the ecology and control of zoonotic diseases.

Journal	Source	Year of first issue	Comments
The Journal of Infectious Diseases	Infectious Diseases Society of America	1904	A frequently cited publication focusing on original research involving the pathogenesis, diagnosis, and treatment of infectious diseases, the microbes that cause those disease, and disorders of host immune mechanisms; published semimonthly.
American Journal of Epidemiology	Johns Hopkins University School of Hygiene and Public Health	1921	Formerly the American Journal of Hygiene and the Journal of Hygiene. Covers empirical research findings, methodological developments in the field of epidemiologic research and opinion pieces. Aimed at both epidemiologists and those who use epidemiologic data, including public health workers and clinicians; published monthly.
American Journal of Tropical Medicine and Hygiene	American Society of Tropical Medicine and Hygiene	1921	Serves as a communication bridge between the application of new laboratory science technologies and the control of human disease in the developing tropics; published monthly.
Avian Diseases	American Association of Avian Pathologists, Inc.	1957	Quarterly publication of research articles, notes, and case reports addressing disease in domestic, captive, and wild birds.
Zoonoses Research	Lyceum Press	1960	This short-lived international journal of epidemiology and epizootiology issued papers in serial form. Volume 1 covered the period of 1960-1962; Thereafter, one volume per year, composed of separate numbers issued irregularly as they became available, was published. Despite its short tenure, numerous important papers of that time by leading scientists appear within this journal.
International Journal of Zoonoses	International Laboratory for Zoonoses, Research Foundation	1974	This quarterly journal ceased publication in 1987; published in Chinese, it is noted here as an example of the sources in other languages that often contain local and regional information not reported elsewhere.
Epidemiological Bulletin	Pan American Health Organization	1980	Provides brief summaries about epidemiological activity of communicable, non-communicable and emerging and reemerging diseases of priority public health concern as well as information regarding technical aspects involved in disease surveillance, prevention and control programs worldwide. Published quarterly and available online: http://www.paho.org/English/DD/AIS/beindexe.htm .
OIE Scientific and Technical Review	Office International des Epizooties (OIE)	1982	Publishes reviews containing up-to-date information of scientific and technical progress associated with the control of animal diseases and zoonoses. Two of the three issues published each year are devoted to a specific theme, such as infectious diseases of wildlife (vol. 21) and prion diseases in animals (vol. 22). The remaining issue publishes non-thematic papers.
Emerging Infectious Diseases	Centers for Disease Control and Prevention	1995	Established expressly to promote the global recognition of new and reemerging infectious diseases; the purposes include understanding the factors involved and providing information to guide disease prevention and control actions. Published monthly and available on-line: http://www.cdc.gov/eid .
Vector Borne and Zoonotic Diseases	Mary Ann Liebert, Inc.	2001	Vector-Borne and Zoonotic Diseases is the first peer-reviewed scientific journal to primarily focuses on diseases transmitted to humans by arthropods or directly by other animals; published quarterly.

Table 7.11 Examples of free on-line databases useful for searching information on zoonoses.

Name	Source	URL	Comments
Agricola	National Library of Agriculture (NAL)	http://www.nal.usda.gov/ag98/ag98.html	Bibliographic database of citations to the agricultural literature created by the NAL and its cooperators. Production of these records in electronic form began in 1970, but the database covers materials in all formats, including printed works from the 15th century.
Agris	Food and Agriculture Organization of the United Nations (FAO)	http://www.fao.org/agris/	AGRIS is the international information system for the agricultural sciences and technology created in 1974 to facilitate information exchange and to bring together world literature dealing with all aspects of agriculture. Free searching from 1975–1997. Current years available through for-profit vendors.
Ingenta	Publicly traded company	http://www.ingenta.com/	A for-profit corporation that allows free searching of a comprehensive collection of academic and professional publications available for online, fax and Ariel delivery.
Medline	National Library of Medicine	http://www.ncbi.nlm.nih.gov/entrez/query.fcgi/	A service of the National Library of Medicine, includes over 14 million citations for biomedical articles back to the 1950s. These citations are from medical journals and additional life science journals. Free through Pubmed.gov.
PrimateLit	National Center for Research Resources, National Institutes of Health, Grant RR15311, "Coordinated Information Services to Support Primate Research."	http://primatelit.library.wisc.edu/	The PrimateLit database provides bibliographic access to the scientific literature on nonhuman primates for the research and educational communities. Coverage of the database spans 1940 to present and includes all publication categories and many subject areas.

information for various animal groups, including protozoa, nematoda, pisces, reptilia, aves, and mammalia. Table 7.12 provides examples of fee-based databases in which information on zoonoses can be found.

Individuals can also order documents directly from the National Library of Medicine and the National Agricultural Library; some articles are free, others charge a fee. Interlibrary loan and document delivery services are available from a university or research library, possibly for a fee. Documents and books requested through a local public library may be less costly, but are the least timely. If the library is not able to fulfill a patron's request, the next step would be to contact the particular state's reference and loan library. The lending library may charge the patron, but in most cases, this service is free. Information about state-run lending libraries can be found at the Web site for the State of Wisconsin's Reference and Loan Library (<http://www.dpi.state.wi.us/dltc/rll/>). Staff

at this library will either fill the requests or direct patrons from other states to similar facilities in their area.

Information brokerage services are another potential resource when time is limited. Fee-based information brokerage services, such as Wisconsin Tech Search and Instant Library, fill information needs by providing literature searches and document retrieval. Service can be as immediate as the next day, but involves a fee. To view a typical schedule of fees go to <http://www.wisc.edu/wendt/wts/> (the homepage for Wisconsin Tech Search).

News Media

Newspapers and major news magazines are common sources of information on emerging infectious diseases and major epizootics affecting free-ranging wildlife populations. One method for finding this type of information is to use an Internet news reader service, which is a software program that

Table 7.12 Examples of fee-based online databases useful for searching information on zoonoses.

Name	Source	Web Address	Comments
Biological Abstracts (BA)	BIOSIS	http://www.biosis.org/products/ba/	Comprehensive worldwide coverage of resources in the biological and biomedical sciences. BA indexes articles from over 4,000 serials
CAB Abstracts	CAB International	http://www.cabi-publishing.org/AbstractDatabases.asp?SubjectArea=&PID=125	Containing over 4 million abstracts; one of the world's largest bibliographic databases covering international research in the applied life sciences. Coverage is especially strong in the field of parasitology. Also, the strong human health component makes CAB well-suited as a source of zoonotic information.
Web of Science	Thomson ISI	http://www.isinet.com/products/citation/wos/	Provides access to current and retrospective multidisciplinary information from about 8,500 of the world's most prestigious research journals.
Zoological Record	BIOSIS	http://www.biosis.org/products/zr/	Oldest continuous coverage of animal biology with references dating as far back as 1864; represents every area of animal biology, from biodiversity and the environment to taxonomy and veterinary sciences.
Wildlife Worldwide	National Information Services Corporation	http://www.nisc.com/frame/NISC_products-f.htm	The world's largest index to literature on wild mammals, birds, reptiles, and amphibians; over 618,975 bibliographic records, many include abstracts. The databases in this exclusive collection offer a global perspective and collectively form the ultimate resource on wildlife information.
Current Contents	Thompson ISI	http://www.isinet.com/products/cap/ccc/	A multidisciplinary current awareness Web resource providing access to complete bibliographic information from over 8,000 of the world's leading scholarly journals and more than 2,000 books. Users also can search a premium collection of scholarly evaluated Web sites and access evaluated full-text Web documents.
Fish and Fisheries Worldwide	National Information Services Corporation	http://www.nisc.com/frame/NISC_products-f.htm	This exclusive collection of databases is indispensable for researchers of fish and fish culture. Files from around the world provide more than 413,540 citations and some abstracts on all aspects of ichthyology, fisheries, and related aspects of aquaculture. Major topics include culture and propagation, limnology and oceanography, genetics and behavior, natural history, parasites, diseases, habitat management, fish processing/marketing, general research, and fisheries.
Aquatic Sciences and Fisheries Abstracts (ASFA)	Food and Agriculture Organization of the United Nations	http://www.fao.org/fi/asfa/asfa.asp	ASFA is an International Cooperative Information System which comprises an abstracting and indexing service covering the world's literature on the science, technology, management, and conservation of marine, brackish water, and freshwater resources and environments, including their socio-economic and legal aspects. The ASFA bibliographic database is the principal output of the system and it contains over 900,000 references, with coverage since 1971.

searches for stories and provides capabilities for following or deleting threads of information. An example of a news reader can be found at <http://www.newsifree.com>, which is a Web site that allows access to nearly 10,000 sources that range from well-known newspapers and magazines to more obscure sources related to specific topics. This site is mainly useful for current information; older material is not archived.

Lexis/Nexis Academic Universe, an on-line service composed of about 5,000 legal, news, reference, and business sources, is the ultimate compilation of archived newspaper information. International and U.S. newspapers, ethnic and regional news sources, magazines, wire services, newsletters, trade journals, company and industry analyst reports, and broadcast transcripts are included and most are full text. Costs for a subscription may be prohibitive for individuals, but access may be possible from an academic library or, possibly, from an information brokering service.

Conclusion

Events of the past quarter century clearly indicate that emerging infectious diseases are a global issue and likely will remain so for the foreseeable future (see Chapter 2). The information maze associated with this subject area is growing, as are the advances in technology that attempt to

manage both the cataloguing of this information and access to it. In general, an increasing amount of today's literature is being published electronically and only can be found and accessed through computer-based systems. The ability to efficiently locate, select, and access available information in paper or electronic form is often a function of how well the searcher understands information systems used to catalogue and inventory the types of information needed. Regardless of the systems used, a useful approach is to consider the subject area as a series of keywords that help to further define the types of information sought.

A general overview of major components of the information maze is provided in this chapter, including systems involved with those components, and some guidance for negotiating the information pathways. The experiences one gains through exploration will dictate what works best for each individual and the type of information needed. Each of the other chapters in this manual provides a wealth of literature citations specific for that subject. Collectively, these citations illustrate the volume of information available and the importance of knowing how to find those of greatest value and interest.

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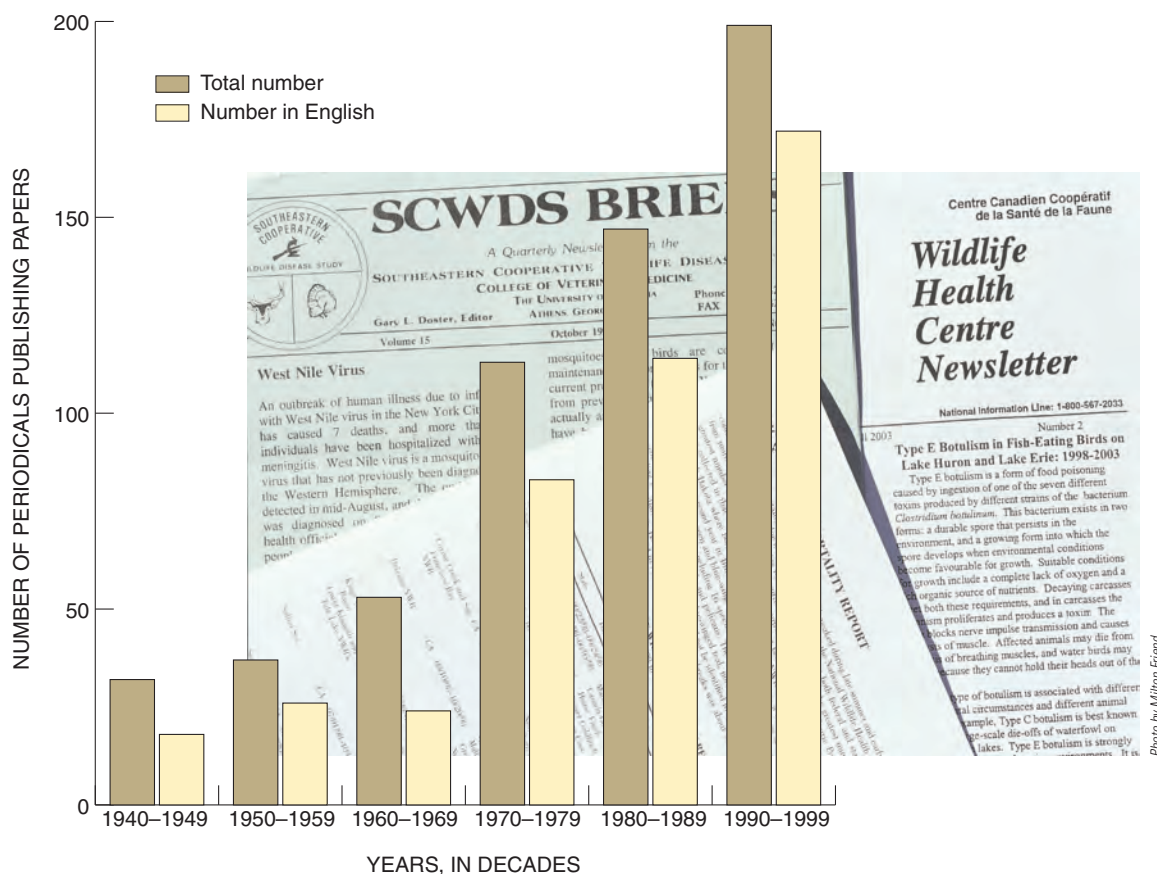


Figure 7.2 Number of periodicals publishing papers on communicable diseases.

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