

New Perspectives in Information Retrieval

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Introduction

When you need information to identify optimal treatment for a patient, to confirm a diagnosis, or to solve an office procedural problem, whom do you call? To these questions and the others that arise in your daily practice of medicine, you have several resources to retrieve the needed information. These include handling the problem on your own, getting help from a capable librarian, or consulting a specialized institution.

On Your Own

Medical training provides the physician information that serves as a base for problem solving. However, no one can stay completely up-to-date on all the latest medical developments in patient management and care. A growing number of medical schools are actively expanding medical curricula to include training in lifelong learning. These courses incorporate information-seeking skills. This is a relatively new trend. It is increasingly important for physicians to develop higher level skills in information retrieval. Patient management with obsolete information can create serious problems for physician and patient.

Faced with a difficult clinical question, most physicians opt to consult a colleague in the same field or a specialist. You can make an in-depth case presentation to a knowledgeable colleague or refer a patient for consultation. A new look by a colleague may give the physician added insight. Success or failure of this approach is influ-

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enced by the communication skills of the sender and the receiver. How well can you as a physician describe the situation? How actively does your colleague listen to your presentation? It is usually difficult to communicate to a colleague or a consultant all the relevant facts with which you are familiar, such as family relationships, personality, environment, educational attainment, and spiritual predisposition of the patient.

A "do-it-yourself" approach includes consulting various textbooks and journals that you own. Remember, by virtue of the publishing process, most information in texts will be somewhat dated by the time the book arrives in your office. Therefore, use only the most recent editions of textbooks to ensure that currently accepted medical care modalities are used.

To locate an article in a journal, try to determine if the journal publishes a periodic index. Most journals publish indexes on a quarterly, biannual, or yearly basis. Check the March, June, September, and December issues for indexes. You may also want to use *Index Medicus* at either your hospital or local medical library to identify appropriate journal articles. You may want to enquire whether or not the library has indexes available on CD-ROM. CD-ROM technology loads bibliographic citations onto optical disks for searching purposes. There are an increasing number of databases available on CD-ROM. A growing number of medical libraries are making the technology available to their patrons.

If you are industrious and want in-depth access to medical literature, consider buying your own computer, communications software, and modem. This allows you to use computerized bibliographic services. A number of services exist for the physician searcher. These services vary from "user-friendly" systems to "front-end" software that allows you to search databases easily. User-friendly systems are often "menu-driven." The computer presents you with a series of options from which you may select one or more, somewhat like a restaurant's menu. You could choose to search for an author or a subject. Companies that offer end-user searching are listed in Table 1. If you are not certain which service to choose, ask the company for a demonstration disk or a demonstration password to help you decide.

Front-end software is another user-friendly method of accessing databases.* The front-end software walks you through the search process, usually prior to logging onto the database service. It utilizes an

*The following names used in this article are registered trademarks: AIDSLINE, BIOSIS Previews, BRS Colleague, CANCERLIT, CA Search, CompuServe, EMBASE, *Grateful Med*, MEDIS, MEDLINE, PaperChase, Poisonsindex, RTECS, SciSearch, TOXLINE, TOXLIT, and Westlaw.

Table 1
Selected End-User Searching Services

Medicine-Oriented Services

BRS Colleague: (800) 955-0906

Contact: BRS Information Technologies

Features: 110 bibliographic databases, including MEDLINE, EMBASE, IPA, and 80 major journals (full text) on-line.

Cost: Moderate

Knowlede Index: (800) 848-8199

Contact: CompuServe

Features: Menu and command mode access to 85 bibliographic databases.

Cost: Expensive

Other: Available only between 6:00 pm and 5:00 am and weekends.

MEDIS: (800) 227-4908

Contact: Mead Data Central

Features: MEDLINE Library, which contains full text articles from about 75 medical journals.

Cost: Expensive

PaperChase: (800) 722-2075

Contact: PaperChase

Features: Easy-to-use system for searching MEDLINE. Will supply articles retrieved for a fee.

Cost: Expensive

Other: Available through CompuServe and Westlaw.

internal communication package to dial up the database and log the physician onto the system. At this point, you may either allow the software to conduct your search or switch to an expert mode to search the system yourself. The general limitation of front-end software is that most software packages are useful with only one database service. The most commonly used front-end software to access medical literature is *Grateful Med*, created by the National Library of Medicine (NLM) for use with their databases. Purchasing information for *Grateful Med* is available in Table 2. The NLM also offers a demonstration disk. Costs of searching databases vary greatly by vendor and by database, so be certain to ask about charges.

Consulting the Medical Librarian

When you reach your personal limit in locating information, consider calling in the cavalry: your favorite medical librarian. Consulting a medical librarian may be limited by your geographic

Table 2
Grateful Med Purchase Information

Grateful Med is available from

National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161
(800) 423-9255 (Voice)
(703) 321-8547 (Telefax)

IBM Version Order Number: PB92-105444

Macintosh Order Number: PB93-502433

Cost: \$29.95

location. If you practice in a metropolitan area with an academic medical center, finding a medical librarian is relatively easy. Contact the medical school or the largest hospital in town and ask for the medical library. If you are adjunct or clinical faculty at a medical school, you are usually eligible for library privileges. Be forewarned that it is possible you will be charged for such services as literature searches and articles. Charges vary by institution. Certain medical schools also offer services to their alumni. If this is not the case, you might discuss the matter with the alumni association, as a service that the school can offer their alumni.

Some state, county, and metropolitan medical societies maintain extensive libraries for their members' use. State medical societies that maintain libraries are listed in Table 3. Various associations, i.e., the American Academy of Family Physicians, maintain libraries for their members. Alternatively, the NLM has established a network of libraries that serve as referral centers for medical libraries and information. A complete listing of these referral centers is available in Table 4.

Qualified medical librarians have certain credentials. The medical librarian should have a master's degree in library science and training in on-line searching, preferably on NLM databases. The physician should feel comfortable asking about the librarian's credentials, such as when he or she last attended an update on a bibliographic database system or other related continuing education courses. If the person maintaining the library is not a trained searcher, call the referral center for your state listed in Table 4.

With the aid of your professional librarian, you will gain access to a wide variety of information sources. In addition to the library's collection, the librarian can access various on-line databases to pro-

Table 3
State Medical Association Libraries

Hawaii Medical Library, Inc. 1221 Punchbowl Street Honolulu, HI 96813 (808) 536-9302	Medical Society of the State of New York Albion O. Bernstein Library 420 Lakeville Road Lake Success, NY 11042 (516) 488-6100
Medical & Chirurgical Faculty of the State of Maryland Library 1211 Cathedral Street Baltimore, MD 21201 (410) 539-0872	Texas Medical Association Library 401 West 15th Street Austin, TX 78701 (512) 370-1550

vide you with almost any medical information you require. On-line literature searching creates a tailored bibliography that answers your specific question or problem. The more details you are able to give the librarian, the more likely your librarian will be able to locate relevant information. As a physician, you should be aware that any information you give to the librarian will be held in the strictest confidence. Librarians have a strong, well-developed set of professional ethics, which precludes revealing any information about a patron's request to anyone. If you have any doubts, be sure to ask about the policies at your library.

Giving the librarian different angles from which to tackle the problem is also often helpful. After all, there is more than one way to enter a house: the front door, the back door, through a window, or down the chimney. Any of these routes will get you into the house. When performing on-line literature searches, the librarian basically uses the same concept to obtain relevant information. For example, if you wanted to know what respiratory problems *Inderal* causes, the librarian would probably use a combination of respiratory distress, lung, and anatomic terms. It would help the librarian if he or she knew that you suspected pulmonary edema, constriction of blood vessels, constriction of the bronchi, or diaphragmatic involvement. If you expect an asthma attack, specify that fact. If you are looking at the relationship between the respiratory system, asthma, and beta blockers, the librarian needs to know. It is best to precisely relate to the librarian both your problem and how you expect the question to be answered.

When presenting a problem to a medical librarian, particularly one that will involve a literature search, the physician should keep the following "golden rules" in mind:

Table 4
National Network of Libraries of Medicine

Region	States served	Regional library
1	DE, NJ, NY, PA	New York Academy of Medicine Library 2 East 103rd Street New York, NY 10029 (212) 876-8763
2	AL, DC, FL, GA, MD, MS, NC, SC, TN, VA, WV, PR, VI	University of Maryland at Baltimore Health Sciences Library 111 South Greene Street Baltimore, MD 21201 (410) 706-2855
3	IA, IL, IN, KY, MI, MN, ND, OH, SD, SD, WI	University of Illinois at Chicago Library of the Health Sciences PO Box 7509 Chicago, IL 60680 (312) 996-2464
4	CO, KS, MO, NE UT, WY	University of Nebraska Medical Center 600 South 42nd Street Omaha, NE 68198 (402) 559-4326
5	AR, LA, NM, OK, TX	Houston Academy of Medicine- Texas Medical Center Library 1133 M.D. Anderson Boulevard Houston, TX 77030 (713) 790-7053
6	AK, ID, MT, OR, WA	University of Washington Health Sciences Library, SB-55 Seattle, WA 98195 (206) 543-8262
7	AZ, CA, HI, NV, US Territories, in the Pacific Basin	University of California at Los Angeles Louise Darling Biomedical Library 10833 Le Conte Avenue Los Angeles, CA 90024-1798 (310) 825-1200
8	CT, MA, ME, NH, RI, VT	University of Connecticut Health Center Lyman Maynard Stowe Library 263 Farmington Avenue Farmington, CT 06034 (203) 679-4500

To reach the Regional Medical Library in your area call (800) 338-7657.

1. **Clearly define** in your own mind the information required to answer your question.
2. **Speak directly to the librarian.** The fewer filters between the physician and the librarian, the more likely the message is to arrive intact and in context.
3. **Specify the type of answer you require.** Do you need a book? A journal article? A telephone number? If the librarian is performing a literature search for you, be sure to communicate such requirements as language, age groups, abstracts, and so forth.
4. **Be absolutely honest** about what it is that you are seeking, thus making it more likely that you will receive it.
5. **Explain the purpose of the search** to the librarian, whether it is for patient care, for a talk to your son's fellow Cub Scouts, or to verify that a case you wish to report has not previously been published.
6. **Specify what you want excluded from the search.**
7. **Plan ahead.** Try to give the librarian ample time to fulfill your request. Librarians engage in a form of triage when fulfilling information requests, giving priority to the urgent requests.
8. **Negotiate financial limits with the librarian.** Depending on the circumstances, the physician may be billed, particularly if on-line databases are utilized. Charges to physicians vary greatly by institution. Basically, almost any information can be retrieved for a price.
9. **Develop a personal rapport with your librarian,** so that you each have a better understanding of the other's interests and needs.

On-line databases usually contain bibliographic citations; however, a growing number of databases provide factual information or actual text from various publications. For a list of relevant databases, consult Table 5.

Other Sources

In addition to relying on your own resources and/or consulting a medical librarian, you as a physician have an almost endless spectrum of additional sources to consult. These sources are limited only by the imagination. They run the gamut from physician associations to institutions. You should utilize the resources of the organizations to which you belong; after all, membership has its privileges. Table 6 contains names and information about

Table 5
Medical Databases

Database	Type	Description
AIDSLINE	Bibliographic	1980–present. A subset of MEDLINE that includes selective indexing from over 4000 journals on AIDS and related topics.
BIOSIS Previews	Bibliographic	1969–present. References over 9000 journals and monographs in the biosciences and medical research. Abstracts dated after July 1976 are available.
CANCERLIT	Bibliographic	1963–present. Indexes cancer-related articles from a wide variety of sources. Produced by NLM, there is some overlap with MEDLINE.
CA Search	Bibliographic	1967–present. Indexes chemistry literature and includes abstracts. On-line version of <i>Chemical Abstracts</i> .
EMBASE	Bibliographic	1974–present. Indexes over 4000 international biomedical journals. Many references include abstracts.
HEALTHLINE	Bibliographic	1975–present. Contains references to health administration-oriented literature, including personnel.
International Pharmaceutical Abstracts	Bibliographic	1970–present. Indexes and abstracts over 650 journals on topics of drug development and usage.
MEDLINE	Bibliographic	1966–present. Indexes over 3700 international medical journals. The NLM indexes each article. Some abstracts are available.
RTECS	Informational	1971–present. Basic toxicity information on over 100,000 chemical substances, including federal standards and regulations. Also contains citations from published and unpublished reports. Maintained by the National Institute for Occupational Safety and Health (NIOSH).
SciSearch	Bibliographic	1974–present. Indexes over 2600 journals in the areas of science and technology.
TOXLINE	Bibliographic	1965–present. Contains references to toxicology literature that does not require royalty charges from 12 indexing sources.
TOXLIT TOXLIT65	Bibliographic	1965–present. Contains references to toxicologic journal literature with royalty charges.

Table 6
Other Sources

AMERICAN CANCER SOCIETY

(404) 320-3333

(800) ACS-2345

AMERICAN LUNG ASSOCIATION

(212) 315-8700

AMERICAN MEDICAL ASSOCIATION

(312) 464-5000

CENTERS FOR DISEASE CONTROL

(404) 639-3311 Operator

(404) 639-3534 Public inquiry in Atlanta, Georgia

(404) 639-3434 Immunology Branch

National AIDS Information Clearinghouse

(800) 458-5231 AIDS Services, publications, clinical trial information.

National Institute for Occupational Safety and Health

(800) 356-4674 Chemical exposure and hazards at work.

CYSTIC FIBROSIS FOUNDATION

(800) 344-4823

FOOD AND DRUG ADMINISTRATION

(301) 443-3170

HEALTH INFORMATION CENTER

(800) 336-4797 Referral and phone numbers to health organizations.

NATIONAL INSTITUTES OF HEALTH

(301) 496-4000 Operator

(301) 496-5787 Public Affairs

*Clinical Center (NIH Hospital for all patients of NIH institutes)

(301) 496-4891 Patient referral—to see if patients qualify for NIH studies.

National Cancer Institute

(301) 496-5583

(800) 422-6237 Information including local hospice groups, hotels near cancer centers, and local support groups.

National Heart, Lung and Blood Institute

(301) 496-4236 Information

(301) 251-1222 Information on smoking, cholesterol, asthma, and high blood pressure.

National Institute of Allergy and Infectious Diseases

(301) 496-5717 Information and pamphlets for patients.

National Institute of Environmental Health Sciences

(919) 541-3345 Information

National Library of Medicine

(800) 272-4787 Touchtone directory

different organizations that may be of interest. With regard to national organizations and governmental agencies, you can expect to have your telephone call transferred several times before you find someone able to answer your questions. Additionally, there are support groups for almost any disease or problem you care to name, many of whom maintain extensive networks and/or databases on their topic, which may provide beneficial insight in treatment. There are too many of these groups to mention here, however, most libraries maintain access to the *Encyclopedia of Associations*, published by Gale Research, which lists many such organizations. For example, the *Encyclopedia of Associations*, includes such listings such as Emphysema Anonymous, Mothers of Asthmatics, National Sudden Infant Death Syndrome Foundation, and the American Board of Medical Toxicology.

Other alternatives are also available. If stumped on a drug, call your pharmacist. In our experience, individuals with their doctorate in pharmacy have been invaluable in providing information on drug-related questions. For toxicology information, your hospital pharmacist may also have access to Poisondex, an outstanding toxicology resource. You may want to consult your telephone yellow pages for listings of information brokers. Information brokers, often librarians, specialize in identifying information and delivering it to you, when and where you need it. If you are in a remote area, you might consider consulting Information on Demand, a national company that provides information. Brokering services are for-profit enterprises, so you may get better service than at your favorite library, for a higher price.

In your quest for information, you will find many allies willing to aid you in delivering quality health care to your patients. Be willing to look beyond the confines of your past experience to ask for assistance from colleagues, medical librarians, associations, boards, and organizations. If you are willing to spend the time and the money, almost any question can be answered.

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