

Appendix E

Electronic Health Information Sources

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An enormous amount of health information is now available in electronic form. Until recently, most of these resources were accessible through dial-up bulletin board systems or, if the files resided on a computer connected to the Internet, through a number of different means of transferring copies of the files from the source computer to a remote user's computer. Recently, however, a new graphical interface to the Internet, known as the World Wide Web (WWW), has made it possible to rapidly retrieve, arrange, and display on *web pages* the contents of files—rather than just their names—and for users to transfer from resource to resource along a virtually endless web of *hyperlinks* with the click of a mouse button.

This appendix briefly surveys some of the audio, visual, textual, and hypertextual health information available on the WWW. The Uniform Resource Locator (URL) that accompanies each electronic resource identifies its location and filename and the appropriate method for accessing the files. The URLs are used by web browser software, such as Netscape Navigator,¹ Mosaic,² or Lynx,³ to locate and retrieve the files. This list of web sites represents only a sample of the wide variety of free health information that is available on the WWW.

¹ Netscape Communications Corp., <URL: <http://home.netscape.com/> >. URLs listed in this appendix are accurate as of the date of publication but will change over time. The indices mentioned in the last section of the appendix should be consulted for updated access information.

² National Center for Supercomputer Applications, <URL: <http://www.ncsa.uiuc.edu> >.

³ W3 Consortium, <URL: <http://www.w3.org/hypertext/WWW/Lynx/Status.html> >.

CONSUMER AND PATIENT INFORMATION

University health clinics are a rich source of information for consumers and patients. Sites such as *Healthwise*⁴ at Columbia University, the *HEALTHLINE Server*⁵ at the University of Montana, and the *HealthInfo Gopher*⁶ at Rice University offer multimedia educational materials, advice columns, mailing lists, and other resources addressing preventive medicine, nutrition, AIDS, sports medicine, drug and alcohol abuse, women's health, sexuality, and other general health information topics. Abstracts and summaries of articles about health issues from newspapers and the popular press are collected at sites such as *Biomedicine and Health in the News*⁷ and *Health and Medicine in the News*.⁸ The Iowa Health Book at *The Virtual Hospital*⁹ has patient information, such as a guide for helping a child cope with visiting a family member hospitalized in an intensive care unit. The *TALARIA Hypermedia Clinical Practice Guidelines for Cancer Pain*¹⁰ and the *PharmInfoNet DrugDB*¹¹ (a descriptive database of pharmaceuticals and their effects, organized according to generic and trade names) are two other examples of resources available throughout the web that may help consumers understand com-

plex medical care. In addition, the web indices summarized at the end of this appendix contain subscription information for a huge variety of e-mail mailing lists and Usenet discussion groups concerning specific diseases and health conditions.

RESOURCES FOR HEALTH PROFESSIONALS

Numerous web pages contain information and hyperlinks designed for specific health professionals. *Nightingale*,¹² *NP Web*,¹³ *Physician's Guide to the Internet*,¹⁴ and the *Interactive Medical Student Lounge*¹⁵ are sites designed respectively for nurses, nurse practitioners, physicians, and medical students. Sites such as the *Emergency Medicine and Primary Care Home Page*¹⁶ provide resources and discussion forums for specialized health disciplines, and reference sites such as the *CHORUS Collaborative Hypertext of Radiology*¹⁷ contain quick reference materials. Cumulative indices of research literature from over 20 different subject areas in biomedicine are maintained at *Current Bibliographies in Medicine*.¹⁸ A variety of sites are devoted to medical education. Some, such as the *University of California at San*

⁴ Columbia University Health Service, Health Education and Wellness Program, <URL: <http://www.cc.columbia.edu/cu/healthwise/>>.

⁵ University of Montana Student Health Services, <URL: <http://healthline.umt.edu:700/>>.

⁶ Rice University Student Health Service, <URL: <gopher://riceinfo.rice.edu/11/Safety/HealthInfo>>.

⁷ University of Connecticut Health Center, Lyman Maynard Stowe Library, <URL: gopher://inform.uhc.edu/11gopher_root%3a%5b_data04._data0401%5d>.

⁸ University of Minnesota, <URL: <gopher://lenti.med.umn.edu:71/11/news/citations>>.

⁹ University of Iowa College of Medicine, Department of Radiology, Electric Differential Multimedia Laboratory, <URL: <http://indy.radiology.uiowa.edu/VirtualHospital.html>>.

¹⁰ University of Washington, Department of Statistics, <URL: <http://www.stat.washington.edu/TALARIA/TALARIA.html>>.

¹¹ Pharmaceutical Information Associates, Ltd., <URL: http://pharminfo.com/drugdb/db_mnu.html>.

¹² University of Tennessee at Knoxville, College of Nursing, <URL: <http://nightingale.con.utk.edu:70/0/homepage.html>>.

¹³ University of New Hampshire, Department of Nursing, <URL: <http://unhinfo.unh.edu/unh/acad/health/nursing/index.html>>.

¹⁴ NetRep Explorist, <URL: <http://www.netrep.com/global/biz/pgi/pgi.html>>.

¹⁵ University of Kansas, <URL: <http://falcon.cc.ukans.edu:80/~nsween/>>.

¹⁶ Emergency Medicine Bulletin Board System, <URL: <http://www.njnet.com/~embbs/>>.

¹⁷ Medical College of Wisconsin, <URL: <http://chorus.rad.mcw.edu/chorus.html>>.

¹⁸ National Library of Medicine, <URL: <ftp://nlmpubs.nlm.nih.gov/bibs/cbm/>>.

*Francisco Primary Care Teaching Module*¹⁹ and *The Interactive Patient*,²⁰ are designed for medical students and residents, and others—including the *University of Washington Radiology Webserv-er*,²¹ the *Interesting Case Conference*,²² and *Med-Ed*²³—offer practice in diagnosis or continuing medical education courses. *MedSearch America*²⁴ is an electronic bank of job listings for health professionals.

MEDICAL IMAGES

As web browsers capable of displaying photographic images and video clips have been developed, the World Wide Web has become an ideal medium for distributing medical images for instructional and historical purposes. The *Visible Human Project*²⁵ documents human anatomy in a series of magnetic resonance, photographic, and computerized tomography images of cross-sections of a human body at one millimeter intervals; the *Visible Embryo Project*²⁶ is a related compilation of images illustrating human developmental embryology. The *GE Three Dimensional Medical*

*Reconstruction*²⁷ page includes animated “fly-throughs” of heart arteries, the lungs, and the brain, and a simulation of a baby delivery. A compendium of brain images is found at the *Whole Brain Atlas*.²⁸ The *Medical Illustrator’s Home Page*²⁹ serves as a contact point for medical illustrators, publishers, authors, and medical schools. Nearly 60,000 historical images from the archives of the National Library of Medicine are found in *OnLine Images from the History of Medicine*.³⁰ An index of other medical imaging resources is found at *Medical Imaging on the Web*.³¹

TELEMEDICINE AND RURAL MEDICINE

Information about distance medicine, telemedicine, and rural medicine can be found at the *Telemedicine Information Exchange*,³² *Telemedicine Resources*,³³ *REACH-TV*,³⁴ and *RuralNet*.³⁵

HEALTH POLICY AND GOVERNMENT

Many government agencies maintain WWW sites with information for both health care professionals and health care consumers. The web site at the

¹⁹ Stanford University and the University of California at San Francisco, Divisions of General Internal Medicine, <URL: <http://www-med.Stanford.EDU/MedCenter/MedSchool/DGIM/Teaching/Modules-index.html> >.

²⁰ Marshall University School of Medicine, <URL: <http://medicus.marshall.edu/medicus.htm> >.

²¹ University of Washington, Department of Radiology, <URL: <http://www.rad.washington.edu/> >.

²² Massachusetts General Hospital, Department of Emergency Medicine, <URL: <http://emergency.mgh.harvard.edu/wicc.htm> >.

²³ Loyola University (Chicago) Medical Education Network, <URL: <http://www.meddean.luc.edu/lumen/MedEd/Medpage.html> >.

²⁴ MedSearch America, <URL: gopher://gopher.medsearch.com:9001/1 >.

²⁵ National Library of Medicine, <URL: http://www.nlm.nih.gov/extramural_research.dir/visible_human.html >.

²⁶ National Museum of Health and Medicine, Human Developmental Anatomy Center <URL: <http://bubba.afip.mil/> >.

²⁷ General Electric Corporate Research and Development, <URL: http://www.ge.com/crd/ivl/three_dim_medical.html >.

²⁸ Harvard Medical School, <URL: <http://www.med.harvard.edu/AANLIB/home.html> >.

²⁹ Mednexus, <URL: http://www.mednexus.com/med_illustrator/index.html >.

³⁰ National Library of Medicine, <URL: <http://www.nlm.nih.gov/hmd.dir/oli.dir/> >.

³¹ Center for Advanced Studies, Research, and Development in Sardinia, <URL: <http://www.crs4.it/~france/MEDICAL/institutions.html> >.

³² Telemedicine Research Center, <URL: <http://tie.telemed.org/> >.

³³ University of Washington, Image Computing Systems Laboratory, <URL: <http://icsl.ee.washington.edu/~cabralje/tmresources.html> >.

³⁴ East Carolina University School of Medicine, Center for Health Sciences Communication, <URL: <http://www.telemed.med.ecu.edu/telemenu.htm> >.

³⁵ Marshall University School of Medicine, <URL: <http://ruralnet.mu.wvnet.edu/> >.

Health Care Financing Administration³⁶ contains information about Medicare and Medicaid, and the web site at the Department of Health and Human Services³⁷ guides consumers to a wide variety of health information available through agencies such as the Food and Drug Administration³⁸ and the National Institute on Aging.³⁹ *The Health Services/Technology Assessment Text*⁴⁰ includes the full text of clinical practice guidelines, quick-reference guides for clinicians, and consumer brochures developed with the support of the Agency for Health Care Policy and Research. The Centers for Disease Control and Prevention⁴¹ and the Public Health Service⁴² maintain WWW sites with information about communicable diseases, epidemics, and population-based health care. Many institutions, such as the World Health Organization,⁴³ maintain web sites with information on international health issues. A useful index to governmental health information resources is found at the *National Health Information Center*.⁴⁴

STANDARDS

Two useful web resources dedicated to the various technical standards discussed throughout this report are the *MSDS Healthcare Standards Home Page*⁴⁵ and the *Gateway to Standards Organizations*.⁴⁶

PROFESSIONAL ORGANIZATIONS AND JOURNALS

Many professional societies including the American Medical Informatics Association,⁴⁷ the American Psychological Society,⁴⁸ and the International Society of Nephrology⁴⁹ maintain web pages with membership information and news about society activities and publications. Peer-reviewed academic journals are beginning to appear online, including *The Digital Journal of Ophthalmology*⁵⁰ and *The Journal of Medical Imaging*,⁵¹ as well as government publications such as the *Morbidity and Mortality Weekly Report*.⁵²

³⁶ Health Care Financing Administration, <URL: <http://www.ssa.gov/hcfa/hcfahp2.html> >.

³⁷ Department of Health and Human Services, <URL: <http://www.os.dhhs.gov/> >.

³⁸ U.S. Food and Drug Administration, <URL: <http://www.fda.gov/fdahomepage.html> >.

³⁹ National Institute on Aging, <URL: <gopher://gopher.os.dhhs.gov/1/dhhs/aoa/aoa/agepages> >.

⁴⁰ National Library of Medicine, <URL: <http://text.nlm.nih.gov/> >.

⁴¹ Centers for Disease Control and Prevention, <URL: <http://www.cdc.gov/> >.

⁴² Public Health Service, <URL: <http://phs.os.dhhs.gov/phs/phs.html> >.

⁴³ World Health Organization, <URL: <http://www.who.ch/programmes/WHOProgrammes.html> >.

⁴⁴ National Health Information Center, <URL: <http://nhic-nt.health.org/> >.

⁴⁵ Duke University Medical Center Information Systems, <URL: <http://www.mcis.duke.edu:80/standards/> >.

⁴⁶ United Technologies National Standards System Network, <URL: <http://hsdwww.res.utc.com/std/gateway/orgindex.html> >.

⁴⁷ American Medical Informatics Association, <URL: <http://amia2.amia.org/> >.

⁴⁸ American Psychological Society, <URL: <http://psych.hanover.edu/APS/> >.

⁴⁹ International Society of Nephrology—Renal Pathology Society, <URL: <http://synapse.uah.ualberta.ca/synapse/000p0035.htm> >.

⁵⁰ Massachusetts Eye and Ear Infirmary, Department of Ophthalmology, <URL: <http://www.meei.harvard.edu/meei/DJOhome.html> >.

⁵¹ Johns Hopkins University, School of Medicine, Department of Radiology and the William H. Welch Medical Library, <URL: <http://jmi.gdb.org/JMI/ejournal.html> >.

⁵² Centers for Disease Control and Prevention, <URL: <http://www.crawford.com/cdc/mmwr/mmwr.html> >.

INDICES

The World Wide Web resources listed above are only a small fraction of the existing sites, and new sites are being developed at a very rapid pace. Several sites maintain current catalogs of health in-

formation resources on the Internet. The index sites include *Medical Matrix*,⁵³ *IHPNet*,⁵⁴ *Hospital Web*,⁵⁵ *The Whole Internet Catalog: Health and Medicine*,⁵⁶ *MedWeb*,⁵⁷ and the *Yahoo! Medicine List*.⁵⁸

⁵³ Internet Working Group of the American Medical Informatics Association, <URL: <http://kuhttp.cc.ukans.edu/cwis/units/medcntr/Lee/HOMEPAGE.HTML> >.

⁵⁴ International Network for Interfaith Health Practices, <URL: <http://www.interaccess.com/ihpnet/health.html> >.

⁵⁵ Massachusetts General Hospital, Department of Neurology, <URL: <http://demonmac.mgh.harvard.edu/hospitalweb.html> >.

⁵⁶ Global Network Navigator, <URL: <http://nearnnet.gnn.com/gnn/wic/med.toc.html> >.

⁵⁷ Emory University Health Sciences Center Library, <URL: <http://www.cc.emory.edu/WHSC/medweb.html#toc2> >.

⁵⁸ Yahoo! Corp., <URL: <http://www.yahoo.com/Health/> >.