

Advances in evidence-based information resources for clinical practice

The health sciences literature contains the most current and detailed accounts of the testing of various phenomena and innovations related to health promotion and disease control. It also contains the best information available for the management of many health care problems. However, it is voluminous and is often neither well written nor organized for easy clinical application. As a result, its use for solving clinical problems is challenging for even the most persistent and knowledgeable clinicians. Most clinicians indicate that they feel overwhelmed by the literature and don't attempt to use it for solving clinical problems (1).

Clinicians can use the clinical literature to support clinical decisions in 2 complementary ways: for regular surveillance and for problem-oriented searches. Both methods require an appreciation of the many purposes of the clinical literature. They also require a basic understanding of the strengths and weaknesses of studies for providing information that is valid and clinically applicable for questions related to the cause, course, diagnosis, and therapy or prevention of health problems.

In general, the peer-reviewed journal literature serves science rather than clinical practice, with its prime function being to facilitate communication from scientist to scientist (2). Most of the investigations reported in journals are nondefinitive tests of hypotheses and innovations, only a small portion of which may eventually survive testing well enough to warrant routine clinical application.

Reports of definitive studies (scientist-to-clinician communication) are not frequently seen. This situation is cause for both celebration and dismay: celebration because clinicians need to review only a small portion of the literature and dismay because journals scatter definitive studies among many preliminary investigations. The reader must know and apply critical appraisal skills to identify them.

Clinical review articles are published even less frequently than definitive studies. These reviews constitute clinician-to-clinician communication, and the new standards for doing and reporting systematic reviews enhance the likelihood that they will provide valid conclusions based on the best available evidence (3). Unfortunately, audits of the methodologic rigor of review articles published in journals over the past several years show that many poor-quality reviews are still being published in journals (4, 5). This problem highlights the need for clinicians to have some knowledge of the principles of critical appraisal.

Many journals also publish case reports and case series. While at first these seem classifiable as clinician-to-clinician communication, they are perhaps best classified as clinician-to-scientist communication. They present ideas that are based on careful observations of unplanned events and that need to be tested in future, planned investigations.

Finally, clinical journals also publish nonclinical scientific articles on a wide range of topics, including news, ethics, parables, and letters. These articles leaven the literature and add enjoyment but at a cost if they distract attention from definitive studies or mislead readers into thinking they bear definitive news for clinical practice when they do not.

PROBLEM-ORIENTED SEARCHING OF THE CLINICAL LITERATURE

The most potent stimuli to learning in clinical practice are the clinical problems we encounter when caring for our patients. To use the clinical literature to help us address these problems, we need to know how to search that literature effectively and efficiently. Recent EBM Notes (6, 7) in *Evidence-Based Medicine* have described both existing resources and search techniques to help clinicians gain quick, easy access to the evidence needed for specific patient questions: These include finding the systematic

reviews, evidence-based summaries, and original scientist-to-clinician reports relevant to patient care. While there is no single complete solution, existing resources are improving and new ones being developed that we wish to keep readers abreast of (see Appendix).

Quick and easy access to evidence (in particular, at the point of care) is one of the challenges facing evidence-based health care practitioners. Recently, a number of tools and services have been developed by evidence-based health care proponents to help meet this challenge. These include periodic print summaries of individual studies, systematic reviews of evidence, electronic databases of reports of original studies, and evidence summaries. Traditional textbooks of clinical practice are gradually being augmented or replaced by electronic versions that are more frequently updated and more often based on current best evidence. Information technology is now being harnessed to provide easy access to evidence-based resources.

Many affordable methods allow access to the clinical literature. The most general of these is the U.S. National Library of Medicine's bibliographic database, MEDLINE, which includes citations from over 3200 journals. The citations are indexed with content terms and increasingly with methods terms that support electronic critical appraisal. MEDLINE is provided free on the Internet from many sites, and at least one of these, PubMed, also includes prestored search strategies that are designed to select studies most likely to be relevant and valid for clinical practice (<http://www.ncbi.nlm.nih.gov/PubMed/clinical.html>). With the provision of more informative abstracts in some journals, the process of critical appraisal and application of the evidence has been streamlined. If there is insufficient information in the abstract, then the full text of the article may be available electronically through Ovid (<http://www.ovid.com>) and other online services.

The Cochrane Library is now a major source of systematic reviews and trials of health care interventions and contains 4 databases: the Cochrane Database of Systematic Reviews (reviews done by Cochrane Review Groups); the Database of Abstracts of Reviews of Effectiveness (systematic reviews published in journals and other, non-Cochrane sources); the Cochrane Controlled Trials Register (a database of randomized trials, many of which are not in MEDLINE); and the Cochrane Review Methodology Database (citations on how to do systematic reviews).

Best Evidence 3 is a CD-ROM containing the cumulated contents of *ACP Journal Club* and *Evidence-Based Medicine*. It provides electronic access to all of the studies that meet reasonable criteria for scientific merit and clinical relevance in the major clinical fields. Plans to include other electronic resources in Best Evidence 4 are under way for the year 2000.

Ovid has released an integrated literature service called Evidence-based Medicine Reviews (EBMR). This CD-ROM and Web-based service includes the Cochrane Database of Systematic

Reviews, Best Evidence, MEDLINE, and over 250 full-text journals. Cross-linkages have been created so that, for example, a search on MEDLINE that retrieves a clinical trial will provide a hypertext link to a Cochrane review or a Best Evidence summary if the trial has been reviewed in these resources. Ovid is a major supplier to health libraries in North America, and many medical school and major hospital libraries now provide access to EBMR.

Such textbooks as *Scientific American Medicine* and *UpToDate* provide increasing support for evidence-based decisions by including extensive journal citations and frequent updating of the text. None of the traditional or electronic general clinical texts, however, follows explicit standards for selection, appraisal, or review of the evidence.

Recently, the BMJ Publishing Group and the American College of Physicians–American Society of Internal Medicine have created *Clinical Evidence*, the first major attempt to provide an up-to-date, evidence-based textbook. A series of clinical questions (focusing on therapy issues) are systematically searched, and the evidence is appraised, summarized, and synthesized. The publishers plan to update the materials twice a year and to develop a Web site where the most up-to-date contributions will be found.

Several other Web sites provide useful evidence to clinicians. The SchARR Web site, maintained by Andrew Booth at the University of Sheffield, points to most of these (<http://www.shef.ac.uk/uni/academic/R-Z/schart/ir/netting.html>). (This site is reviewed in the Resource Corner section of this issue.)

A NEW ADDITION TO THIS JOURNAL

Growth of evidence resources has exploded over the past several years, and it is now becoming a challenge for clinicians to find the most valid and useful evidence-based resources with which to practice. Beginning with this issue, a section titled "Resource Corner" will publish reviews of evidence-based health care resources written by front-line clinicians. These resources will include journals (primary and secondary), evidence-based textbooks, computer software, and Web sites. Each issue of the journal will contain up to 2 reviews of such products. The ratings are based on a five-star system; the number of black stars correlates with the reviewer's opinion of the quality of the resource.

Only clinicians without competing interests in the resource under review will be asked to write a review. Our reviewers will be asked to consider specific methodologic guides (available to view on <http://hiru.mcmaster.ca>) when assessing these resource products. In particular, they will consider whether the authors of the resources have identified explicit criteria for determining the validity of the evidence and whether they adhere to these criteria. The reviewers will also provide a "bottom-line" recommendation indicating whether and how the resource could be used in practice. We will make the reviews available on the Web and will provide electronic links to the reviewed product where possible.

If you would like to review an evidence-based health care resource for this journal or would like to nominate a product to be reviewed, please contact Dr. Sharon Straus, Department of Medicine, Mount Sinai Hospital, Toronto, Ontario M5G 1X5, Canada; FAX 416-586-8434.

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References

1. Williamson JW, German PS, Weiss R, Skinner EA, Bowes F 3d. Health science information management and continuing education of physicians. *Ann Intern Med.* 1989;110:151-60.
2. Haynes RB. Loose connections between peer-reviewed clinical journals and clinical practice. *Ann Intern Med.* 1990;113:724-8.
3. Oxman AD, Guyatt GH. Guidelines for reading literature reviews. *CMAJ.* 1988;138:697-703.
4. Mulrow CD. The medical review article: state of the science. *Ann Intern Med.* 1987;106:485-8.
5. McAlister F, Lawson F, Straus SE, et al. The medical review article revisited. *Ann Intern Med.* (In press).
6. Booth A, O'Rourke AJ. Searching for evidence: principles and practice [EBM Note]. *Evidence-Based Medicine.* 1999;4:133-6.
7. McKibbon KA, Richardson WS, Walker-Dilks C. Finding answers to well-built questions [EBM Note]. *Evidence-Based Medicine.* 1999;4:164-7.

Appendix. List of selected evidence-based health care resources

TEXTBOOKS

- Black ER, Bordley DR, Tape TG, Panzer RJ. *Diagnostic Strategies for Common Medical Problems.* 2d ed. Philadelphia: American College of Physicians; 1999.
- Clinical Evidence. London: British Medical Association; 1999. (<http://www.bmjpg.com/index.html>)
- Dixon RA, Munro JF, Silcocks PB. *Evidence Based Medicine: Practical Workbook for Clinical Problem Solving.* Boston: Butterworth-Heinemann; 1996.
- Friedland DJ, Go AS, Shlipak MG, et al. *Evidence-Based Medicine: A Framework for Clinical Practice.* Stamford, CT: Appleton & Lange; 1998.
- Greenhalgh T. *How to Read a Paper: The Basics of Evidence Based Medicine.* London: BMJ Publishing Group; 1997.
- Haines A, Donald A, eds. *Getting Research Findings into Practice.* London: BMJ Publishing Group; 1998.
- Lancaster T. *Practising Evidence-Based General Practice. Learner's Manual.* Oxford: Radcliffe Medical Press; 1999.
- Last JM, ed. *A Dictionary of Epidemiology.* 3d ed. New York: Oxford University Press; 1995.
- Levine M, Lexchin J, Pellizzari R. *Drugs of Choice: A Formulary for General Practice.* Ottawa: Canadian Medical Association; 1998.
- McQuay HJ, Moore RA. *An Evidence-based Resource for Pain Relief.* Oxford: Oxford University Press; 1998.
- Ridsdale L, ed. *Evidence-based Practice in Primary Care.* Edinburgh/New York: Churchill Livingstone; 1998.
- Sackett DL, Richardson SR, Rosenberg W, Haynes RB. *Evidence-Based Medicine: How to Practise and Teach EBM.* Edinburgh: Churchill Livingstone; 1997.
- Silagy C, Haines A, eds. *Evidence Based Practice in Primary Care.* London: BMJ Books; 1998.
- Straus SE, Badenoch D, Richardson WS, Rosenberg W, Sackett DL. *Practising Evidence-Based Medicine. Learner's Manual.* 3d ed. Oxford: Radcliffe Medical Press; 1998.
- Straus SE, Sackett DL. *Practising Evidence-Based Geriatric Medicine. Learner's Manual.* Oxford: Radcliffe Medical Press; 1999.

COMPUTER-BASED PRODUCTS

- Best Evidence. Philadelphia: American College of Physicians. Ordering information http://www.acponline.org/catalog/electronic/best_evidence.htm
- Cumulated contents of *ACP Journal Club* (since 1991) and *Evidence-Based Medicine* (since 1995) in an annual CD. Also on the Internet through Ovid's Evidence-Based Medicine Reviews <http://www.ovid.com/product/ebmr/ebmr.htm>
- The Cochrane Library. Update Software. Ordering information <http://update.cochrane.co.uk/> and <http://www.update-software.com/ccweb/cochrane/cdsr.htm>. Also available through Ovid's Evidence-Based Medicine Reviews (see above).
- Drugs of Choice. Canadian Medical Association: Ottawa. Available on 3.5-inch disk for Windows. Ordering information <http://www.cma.ca/catalog/252.htm>.
- SAM-CD. Scientific American Medicine: New York. Scientific American Medicine on a compact disk and World Wide Web. Ordering information <http://www.samed.com>.
- UpToDate. UpToDate Inc.: Wellesley, MA. Quarterly CD. Ordering information <http://www.uptodate.com/>.

WEB-SITES ON EVIDENCE-BASED MEDICINE *

- ACP Journal Club
<http://www.acponline.org/journals/acpjc/jcmenu.htm>
- Bandolier
<http://www.jr2.ox.ac.uk/Bandolier/>
- Best Evidence (to order, in the United States)
http://www.acponline.org/catalog/electronic/best_evidence.htm
- Biomednet (free registration)
<http://biomednet.com/>
- Canadian Task Force of Preventive Health Care
<http://www.ctfphc.org>
- Cochrane Library (United Kingdom)
<http://www.update-software.com/clibhome/clibdemo.htm>
- Cochrane Library (San Diego)
<http://www.updateusa.com/clibpw/clibdemo.htm>
- Community of Science (user i.d. and password required)
<http://.cos.com/>

(continued on next page)

*A sampling, with links from these to many other sites.

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Critical Care Critically Appraised Topics

<http://ahsn.lhsc.on.ca>

EBM Journal (Evidence-Based Medicine en français)

<http://www.ebm-journal.presse.fr/ebmjourn/>

Evidence-Based Medicine

<http://www.acponline.org/journals/ebm/ebmmenu.htm>

Evidence-Based Mental Health

<http://www.ebmn-online.com>

HealthGate

<http://www.healthgate.com>

HealthWorld

<http://www.healthworld.com/Library/search/medline.htm>

Institute for Clinical Evaluative Sciences Informed newsletter

<http://www.ices.on.ca/docs/informed.htm>

Journal of Family Practice Patient-Oriented Evidence That Matters (POEMS)

<http://jfampract.com/>

Knowledge Finder (must be registered user)

<http://www.kfinder.com/>

Links to journal Web sites and full-text journal articles:

<http://pslgroup.com/dg/medjournals.htm>

<http://www.nthames-health.tpmde.ac.uk/connect/journals.htm>

McMaster University Health Information Research Unit

<http://hiru.mcmaster.ca>

Miner Library in Rochester

<http://www.urmc.rochester.edu/Miner/Links/ebmlinks.html>

National Guideline Clearinghouse

<http://www.guideline.gov>

Neurosurgery

<http://www.brown.edu/Departments/Neurosurgery/EJC/journ.html>

Number needed to treat (NNT) calculators and tools

<http://www.shef.ac.uk/~scharr/ir/nnt.html>

Oxford Centre for Evidence-Based Medicine

<http://cebml.jr2.ox.ac.uk>

PalmTop software for EBM

<http://www3.mtco.com/glwoods/Default.htm>

Pediatric Critical Care Medicine

http://pedscm.wustl.edu/EBJournal_club.html

ScHARR (links to most other EBM sites)

<http://www.shef.ac.uk/uni/academic/R-Zscharr/ir/netting.html>

Society for General Internal Medicine Medical SmartSearch

<http://smartsearch.uthscsa.edu/cgi-bin/smartsearch.exe>

University of York/NHS Centre for Reviews and Dissemination

(including links to Effective Health Care and Effectiveness Matters)

<http://www.york.ac.uk/inst/crd/dissemination.htm>

World Wide Web-based EBM Hedges:

<http://www.mssm.edu/library/ebm/ebmhedges.htm>

CORRECTIONS

In the Bakker abstract (1), under the sub-heading “Description of tests and diagnostic standard,” “Patients with UAER (20 mg/min)” should have been “Patients with UAER (20 µg/min).”

Reference

1. Albumin-to-creatinine ratio in a timed overnight urine sample was accurate for screening for microalbuminuria in diabetes mellitus [Abstract]. *ACP J Club*. 1999 Sep-Oct;131:47. Abstract of: Bakker AJ. Detection of microalbuminuria. Receiver operating characteristic curve analysis favors albumin-to-creatinine ratio over albumin concentration. *Diabetes Care*. 1999 Feb;22:307-13.

The citation of a recent abstract (1) included an incorrect journal title. The correct abbreviated title is *Qual Health Care*, not *Health Care* as originally stated.

Reference

1. Review: Multicomponent exercise and psychosocial programs are somewhat effective for cardiac rehabilitation [Abstract]. *ACP J Club*. 1999 Sep-Oct;131:41. Abstract of: Dinnes J, Kleijnen J, Leitner M, Thompson D. Cardiac rehabilitation. *Qual Health Care*. Mar 1999; 8:65-71.