Evidence-Based Cardiology: Where to Find Evidence

Otávio Berwanger, Álvaro Avezum, Hélio Penna Guimarães
Instituto Dante Pazzanese de Cardiologia - São Paulo, SP - Brazil

Introduction

Evidence-based medicine (EBM) is defined as the conscious, explicit, and judicious use of the best evidence available in medical literature for making decisions related to the management of patients[1,2]. It consists of a systematic process of selection, analysis, and application of valid results of scientific publications as the basis for clinical decisions[3,4]. Such decisions include quantifying risk, choosing diagnostic methods, establishing a prognosis, and choosing the best therapeutic approach.

"Evidence" is understood to be clinical studies published in diverse periodicals of electronic databases in the form of original articles, structured summaries of original articles, systematic reviews, and health technology assessments and guidelines.

Close to two million medical articles are published each year, which means that health professionals seeking clinical-epidemiological evidence may at first have some difficulty in finding the desired information. In addition, the quest for non-systematized evidence may be tiring and not very productive. However, great strides have been taken in recent years toward developing, synthesizing, and organizing evidence in different databases that can be consulted for help in making clinical decisions[5-7].

Where to find original articles

Searching electronic databases (Medline and Embase)

Medline, of the US National Library of Medicine, and Embase, its European correspondent, are large databases that aim to cover the majority of the publications related to biomedical research.

Medline was the first available electronic source of evidence. It is still an excellent resource for those seeking scientific proof when other more specialized consultation services are not available, or when planning a generic search of medical literature. An appropriate search strategy must be developed in order to obtain high quality scientific articles on Medline.

Currently, the best way of identifying original articles on Medline is through PubMed (www.pubmed.com) of the U.S. National Library of Medicine, since this electronic site offers advantages such as free access, the possibility of taking an online tutorial, a mesh browser tool, and a clinical queries tool.

The mesh browser tool makes it possible to identify key words of the Medline system on the targeted topic, making the search for articles less subject to noncapture of fundamental articles.

The clinical queries tool makes it possible to use specific methodological filters for different clinical aspects (therapeutic, preventive, diagnostic, prognostic, or etiological). For example, when choosing the therapeutic aspect, the use of these methodological filters ensures that the results of the search are preferentially randomized clinical tests and systematic reviews, and not articles on basic research or others unrelated directly to the question that is of interest.

Searching in primary periodicals

Generally speaking, primary journals contain original articles, review articles, case studies, editorials, specific sections, and letters from readers. Among the more important are the New England Journal of Medicine, The Lancet, British Medical Journal (BMJ), and JAMA. Of these, BMJ allows total access to the original articles, unlike most of the other journals.

Such journals are usually easily accessible in libraries and available in the form of electronic publications on the Internet. In Brazil, some electronic sites offer free access to complete articles, as is the case of "Periódicos Capes" (www.periodicos.capes.gov.br), available at certain universities and institutions.

Mailing Address: Otávio Berwanger • Av. Dr. Dante Pazzanese, 500 – 13º andar - 04012-909 – São Paulo, SP - Brazil
E-mail: otavioberwanger@yahoo.com.br
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Where to find structured summaries of original articles?

ACP Journal Club and Evidence Based Medicine (www.acpjc.org)

These are journals published every two months by the American College of Physicians (ACP) and by the British Medical Journal (BMJ), respectively. They feature relevant articles recently published in the major primary periodicals, selected, critically appraised, and presented in the form of structured summaries. The ACP Journal Club is more specific, including only medical clinic articles, while Evidence Based Medicine covers areas such as pediatrics, psychiatry, gynecology and surgery, as well as internal medicine. The editors of these publications use well-established scientific criteria to select the articles, giving preference to those publications that are capable of providing information directly applicable in clinical practice.

The summaries of articles are presented in a format that eases interpretation and applicability of the studies analyzed. They include the declarative title (containing the study's main finding), the main clinical question, design, population studied, main results expressed in the form of clinical-epidemiological parameters of impact (not always used in the original articles) such as NNT, and conclusion.

Each summarized article also features comments by a specialist on the importance of the findings. In addition, the editorial of these journals provide excellent educational material on evidence-based medicine. The CD-ROM entitled Best Evidence, updated every year, compiles all the issues of the ACP Journal Club and Evidence-Based Medicine. Currently, a yearly subscription also makes it possible to access these journals online at the www.acpjc.org website.

In the case of cardiology, there is the journal entitled Evidence-based Cardiovascular Medicine (www.harcourt-international.com/journals/ebcm/) that features the same summarizing and data presentation principles.

Critical appraisal of a topic (Critically Appraised Topic – CAT)

For critical appraisal of topics, Critically Appraised Topic – CAT – www.cebm.jr2.ox.ac.uk is a rich and easily accessible electronic site. Appraisals are made based on actual clinical doubts stemming from the treatment of patients. They are organized in a fashion quite similar to that used for summarized articles in the ACP Journal Club and Evidence Based Medicine journals, including the declarative title, clinical question, and other items. Besides constituting a source of evidence, the CATs are an important educational resource. These appraisals were the basis for a book on the handling of urgencies and emergencies entitled Evidence Based on Call – Acute Medicine, which can be accessed at the www.eboncall.org website.

Along the same line as the CAT, other centers also have similar proposals. Among these is POEM (Pieces of Evidence that Matter), published in the BMJ and also accessible on the www.infopoems.com website. Another good site is Best Bets (www.bestbets.com).

Where to find systematic reviews?

The main sources of systematic revisions are the Cochrane Library, a publication of Cochrane Collaboration (www.cochrane.org), and The York Database of Abstracts of Reviews of Effectiveness (DARE) of the NHS Centre for Reviews and Dissemination. Cochrane Collaboration consists of an international group of physicians, researchers and institutions whose aim is to prepare, maintain, and publicize systematic reviews[8].

The Cochrane Library was set up to be one of the most complete and important sources of evidence for clinical decision-making. It currently consists of the four healthcare databases listed below.

A) Cochrane Database of Systematic Reviews, which contains approximately three hundred systematic reviews and three hundred protocols covering areas such as obstetrics and neonatology, cerebralvascular diseases, diabetes, and respiratory diseases among several others.

B) The York Database of Abstracts of Reviews of Effects (DARE): complementing the data contained in the database of systematic revisions, DARE includes detailed critical analyses of two hundred revisions and summaries of publications of international health technology publications. It can be accessed free of charge at www.york.ac.uk/inst/crd/welcome.htm, the website of the NHS Centre for Reviews and Dissemination, where it is also possible to access the Health Technology Assessment Database and the NHS Economic Evaluation Database (containing mainly cost-effectiveness studies).

C) The Cochrane Controlled Trials Register (CCTR), which contains bibliography of more than 350,000 clinical tests identified by the Cochrane Collaboration team and other health professionals. This database includes various studies not listed on MEDLINE or other bibliographic files.

D) The Cochrane Review Methodology Database (CRMD) that consists of a collection of articles and manuals on the methodology of systematic revisions.

In Brazil it is currently possible to access the Cochrane Library free of charge by registering through Bireme at www.bireme.br, or the Biblioteca Virtual em Saúde-BVS at http://bvsalud.org.

Where to find Health Technology Assessments (HTA)?

Health technology assessment is currently an essential part of the organization of health services and a clinical decision-making support tool. Various websites feature systematic revision on the subject, including aspects of economic evaluation in healthcare, especially cost-effectiveness studies. Following are some of the major sites.

A) National Library of Medicine's Health Services/ Technology Assessment Text (HSTAT) (text.nlm.nih.gov/ftrs/gateway).

B) Evidence-Based Practice Centers/ Evidence-Based Reports (www.ahcpr.gov/clinic/epc).

C) The NHS Centre for Reviews and Dissemination/ HTA Database (http://agatha.york.ac.uk/htahp.htm).

D) NICE- Technology Appraisals (www.nice.org.uk/).

E) Catalogue of the New Zealand HTA (nzhta.chmeds.ac.nz/nzhtainfo/service.htm).

F) International Network of Agencies for Health Technology Assessment (INAHTA). (http://www.inahta.org/)

Where to find guidelines?

Guidelines are systematic clinical positions established by official societies or organizations with a view to providing health professionals with updated information regarding the handling of diverse clinical problems. Ideally, such resources should be set up to respond objectively to specific clinical questions based on systematic reviews and randomized clinical tests. The guidelines do feature potential limitations such as the fact that many of their recommendations are based solely on the opinion of specialists and not on consistent evidence. In addition, some of these positions are sponsored by the pharmaceutical industry and thus entail conflict of interests. The main guideline search sites are the National Guidelines Clearinghouse (www.guideline.gov), NICE/NHS - Guidelines (www.nice.org.uk), Guidelines International Network (www.g-i-n.net), and SIGN- Guidelines (www.sign.ac.uk).

Is it possible to carry out an integrated search for evidence?

SumSearch (www.sumsearch.uthscsa.edu/searchform4.htm) is one of the main electronic addresses that offers a unified, free-of-charge search for guidelines, systematic reviews, and original articles. In addition, as is the case with PubMed, users can specify the clinical-epidemiological focus of interest in their search for evidence.

OVID (www.ovid.com) provides access to databases such as Medline and Embase, and to various periodicals. The EBM database, called Evidence Based Medicine Reviews (EBMR), was recently added. This database includes some of the most important sources of evidence such as Best Evidence and Clinical Evidence. The downside is that this site is not free of charge.

Are there textbooks that feature EBM concepts?

There are textbooks currently available that include chapters dealing with EBM concepts. In the case of therapeutic interventions, one of the most complete and of highest quality is Clinical Evidence (www.clinicalevidence.com). This is a compendium, updated every six months, that discusses the benefits and risks of various medical interventions based on systematic reviews and randomized clinical tests. Its focus is basically preventive-therapeutic, and its chapters are organized based on clinical questions such as "What is the risk associated to the use of thrombolytics in the treatment of ischemic stroke?"

Clinical Evidence has the added advantage of featuring evidence search and evaluation methods in its text. It includes topics on various different fields of medicine such as cardiology, psychiatry, gynecology, gastroenterology, pulmonology, pediatrics, and others.

Apart from the textbook version, Clinical Evidence is also available in electronic versions, on CD-ROM and for use in handheld computers (Palmtops and Pocket PCs). A recent release was Clinical Evidence Cardiovascular Disorders (www.clinicalevidence.com), which features only the chapters on cardiovasular medicine contained in the unabridged edition of Clinical Evidence.

The book entitled Evidence Based Cardiology, edited by Yusuf et al and published by the BMJ, is a textbook that covers the main clinical themes on cardiovascular diseases and includes EBM concepts explicitly in its chapters, which makes it an excellent reference source. This book also has the advantage of providing updating on its website (www.evidbasedcardiology.com) and is also available for use in PDAs.

Another textbook – also entitled Evidence Based Cardiology but published by Shane and Cannono – features a collection of key references on broad themes in cardiology. Given its format as a manual, it has the advantage of being quick and easy to consult in day-to-day clinical practice.

Other electronic addresses

The website addresses listed below provide educational material on EBM such as electronic calculators, critical analysis cards on articles, course schedules, workshops and links to other that may be of interest.

A) Centre for Evidence-Based Medicine – University of Oxford (www.cebm.jr2.ox.ac.uk)

B) Centre for Evidence-Based Medicine – University of Toronto (www.cebm.utoronto.ca/)

C) McMaster University Health Information Research Unit (www.hiru.mcmaster.ca/)

D) Evidence-Based Medicine Education Center of Excellence - North Carolina (www.hsl.unc.edu/ahec/ebmcoe/pages/index.htm)

Also useful are sites that provide updated material about critical appraisal cards on articles such as the Centre for Health Evidence at www.cche.net/principles/content_all.asp, which provides electronic versions of the series of articles entitled "User's Guide to the Medical Literature" published in JAMA by the Evidence-Based Medicine Working Group, and the Critical Appraisal Skills Program-CASP at www.phru.org.uk/~casp/casp.htm.

Websites that provide training for searches in medical literature are also available. Highlights among these are ADEPT (Applying Diagnosis, (a) Etiology, Prognosis & Therapy methodological filters to retrieving the evidence) at http://www.egroups.com/group/adept, and the PubMed tutorial at www.pubmed.com.

Pertinent information is also to be found at websites such as that of the periodical Bandolier at www.bandolier.com, which is also an excellent collection of material on principles of EBM practice, as well as updates on various themes related to diverse medical specialties.

When to use each of the various sources of evidence

On certain occasions, such as daily clinical practice, there is a need to find evidence more quickly. At other times, such as in drawing up a research project, a more comprehensive search is needed. Thus, to optimize EBM practice, it is essential to determine the function of the various sources of evidence. Table I shows some of the main sources of evidence discussed in this text and an evaluation of their utility.

Table I - Databases for the practice of evidence-based medicine

Sources of evidence (electronic addresses)	When should they be used?
Original articles • PubMed/MEDLINE (www.pubmed.com) • EMBASE (www.ovid.com)	Particularly useful when a more complete review of any specific theme is needed. Their use requires time and specific skills.
Structured summaries • ACP Journal Club (www.acpjc.org) • Evidence-Based Medicine • CATs (www.cebm.jr2.ox.ac.uk) • POEMs (www.infopoems.com) • BESTBETs (www.bestbets.com)	Especially useful when there is a need for updating on a certain theme and the time available for a search in the medical literature is limited (for example, in daily clinical practice).
Systematic reviews • Cochrane Library (www.bireme.br) • DARE (www.york.ac.uk/inst/crd/welcome.htm)	Useful whenever there is a need to search systematic reviews or even references to randomized clinical tests. The available material is more complete in regard to questions of prevention and treatment.
Health technology assessments • National Library of Medicine's Health Services/Technology Assessment Text (HSTAT) (text.nlm.nih.gov/ftrs/gateway) • Evidence-Based Practice Centers/ Evidence-Based Reports (www.ahcpr.gov/clinic/epc) • The NHS Centre for Reviews and Dissemination/HTA Database (agatha.york.ac.uk/htahp.htm) • NICE- Technology Appraisals (www.nice.org.uk/) • Catalogue of the New Zealand HTA (nzhta.chmeds.ac.nz/nzhtainfo/service.htm) • International Network of Agencies for Health Technology Assessment (INAHTA) (www.inahta.org/)	If possible, all health services or systems should attempt to utilize and produce HTAs (health technology assessments). Searches at these electronic addresses can provide information on existing HTAs as well as on methodologies for the production of new HTAs.

Guidelines • National Guidelines Clearinghouse (www.guideline.gov) • NICE/NHS - Guidelines (www.nice.org.uk), • Guidelines International Network (www.g-i-n.net) • SIGN - Guidelines (www.sign.ac.uk/)	Selected searchable electronic addresses guidelines on any specialty.
Textbooks Clinical Evidence (www.clinicalevidence.com)	Especially useful when seeking updates on questions regarding prevention and treatment of common diseases.
Integrated search in medical literature • SumSearch (sumsearch.uthscsa.edu/searchform4.htm) • OVID (www.ovid.com)	Allow simultaneous searches in various sources of evidence.
General EBM concepts • Centre for Evidence-Based Medicine – University of Oxford (www.cebm.jr2.ox.ac.uk) • Centre for Evidence-Based Medicine – University of Toronto (www.cebm.utoronto.ca/) • McMaster University Health Information Research Unit (hiru.mcmaster.ca/) • Evidence-Based Medicine Education Center of Excellence - North Carolina (www.hsl.unc.edu/ahec/ebmcoe/pages/index.htm)	These sites should be the starting point for all health professionals interested in practicing EBM. They are especially useful for an introduction to general EBM concepts and to obtain top quality educational material for teaching and/or practice.
Links to various EBM sites • Netting the Evidence (ww.shef.ac.uk/~scharr/ir/netting)	This site is always recommended as it provides access to all the major EBM electronic addresses.

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