The Science of Searching - How to Find the Evidence Quickly and Efficiently

Abstract:

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Abstract
One of the most common findings from health research is the failure to routinely translate research evidence into daily practice. Studies simply canâ t guarantee the use of their findings. There is just too much research to keep track of and so a large gap develops between what is known and what is done. Evidence that should change practice is often ignored for years. The literature is constantly changing and when an answer to a clinical question is sought, it often comes from an out-of-date textbook. Remaining knowledgeable of current, relevant research is difficult. Consequently, the development of skills in searching electronic databases is vital for the up-to-date clinician.

Introduction
Significant resources and time are invested in the production of research knowledge.[1] However, it often takes as long as 17 years to translate findings from research into clinical practice.[2] Basing the choice of treatment exclusively on instinct or tradition is not desirable.[3] Intuition should be informed by the best available research evidence. Consequently, easy access to scientifically valid and up-to-date information is a perquisite for providing the best care to patients.[4] Doctors need to have some method to quickly and reliably access new research evidence to benefit their patients. Evidence-based medicine (EBM) is about the â conscientious, explicit and judicious use of current best evidence in making decisions about individual patientsâ .[3] It involves integrating individual clinical expertise and the patientâ s preferences with the best available clinical evidence from current research. There are a number of steps in practicing EBM. Initially, the process involves asking an answerable question and then searching for the available evidence. Next, the detected evidence is critically appraised for its validity and relevance before making a clinical decision by integrating the evidence with clinical experience and the patientâ s values. The whole idea is to improve patient care by searching for the best research evidence and then moderating it with both clinical expertise and the preferences of the patient.

Searching skills
Medical literature doubles every ten years and reviewing all the available literature is obviously not feasible. Searching skills then are necessary for every clinician hoping to stay up to date. Finding the best evidence requires knowledge of the most appropriate information sources and the best ways to search them.[5] Understanding databases rather than acquiring advanced IT skills is the secret. The first step in efficient searching for evidence is to formulate an answerable clinical question.[5] The question can then be answered by searching online bibliographic databases that allow thousands of journal articles to be returned in a relatively short period of time. Many hospitals now have good internet access and the ability to search electronic databases effectively is an important aspect of EBM. It is generally recommended that doctors become familiar with at least two electronic databases, such as The Cochrane Library and MEDLINE. The Cochrane Library is available free in Ireland as is the user-friendly PubMED, the most widely searched database dealing with the biomedical literature. Once we have decided on the keywords of our question and selected the appropriate database, we can now run the search. The aim is to have quick access to reliable clinical studies related to therapy, diagnosis, aetiology, or prognosis.

The Internet
The Web is an unmanageable ocean of information as well as of misinformation.[6] Quality of information is variable with authority and currency being problematic. The Web is contributed to by experts and non-experts alike so there is no guarantee of reliability or accuracy. Internet users rarely go past the accessible, but unreliable, first page of hits. Of the 25 billion pages of the world-wide web, it is best to stick to sites that you can trust. This is where on-line clinical databases, such as The Cochrane Library, MEDLINE, and EMBASE, are essential. These databases address similar topics, but from a different point of view, so while there is some overlap,[5] it is essential to search more than one electronic database in order to be comprehensive.[5] The Cochrane Library has a number of databases containing journal articles that have been specifically indexed for easy retrieval.

The Cochrane Library
The Cochrane Library is a vehicle designed to make available clinical evidence at the point of care. It is provided by an international collaborative involved in the systematic reviewing, appraising, and disseminating of accurate and reliable evidence in all branches of medical science. The Libraryâ s databases contain high-quality, independent evidence to inform healthcare decision-making. You can search the whole Cochrane Library or just the individual databases within it. The Cochrane Collaboration has been developing a specific database or register of reports of controlled trials called The Cochrane Central Register of Controlled Trials, known as CENTRAL. This is generally considered to be the best single source of reports of clinical trials.[7] The Library, easily accessed via the internet, also has a highly regarded database devoted to quality-appraised systematic reviews, seen as the highest level of evidence. Access to the full text of the retrieved article is often available for printing or storage. While the Cochrane Library is often the best place to start a search, it is wise to move beyond a standard or favourite computer database and access the next most important sources of reports of trials: MEDLINE and EMBASE.

MEDLINE
MEDLINE is the major bibliographic database for biomedical literature.[7] Available on the internet, the database contains citations (author and date) and abstracts (a brief summary) from journals published in many countries. MEDLINE is an excellent, general database, very good for developing search skills. It covers all health specialities, including nursing and health management. PUBMED is the wider, more up-to-date, free web version of MEDLINE and is very useful in daily searching. Next, it is important to try the excellent EMBASE. This international database is the European complement to MEDLINE and contains abstracts on medicine and pharmacology. These two databases do overlap but will not return exactly the same citations so it is best to search both electronic sources.[8] CINAHL is good for nursing and allied health, while PsycInfo is an excellent resource for human behaviour and psychology questions. This array of computer, bibliographic databases is useful for most healthcare topics.

The Search
To develop an effective search strategy to answer a clinical query, it is important to transform the clinical problem into a manageable question. Next, the key words must be identified and a note made of similar terms or synonyms. Clearly you cannot type the whole detailed clinical problem into a search engine like BING: â Will multivitamins help a young man become less depressed?â Few relevant results will be retrieved. So instead, we type in specific key words such as, â multivitaminsâ , â adultâ , â depressive disorderâ , and â recoveryâ . In order to be comprehensive, all alternative terms and spellings should be used. The key words may then be linked using the appropriate combining term or universal â Boolean operatorâ . Boolean operators include terms such as â ANDâ that link our key words and makes them more relevant to the research question. The Boolean operator â ANDâ narrows the search while â ORâ broadens our search allowing the speedy location[5] of the most relevant research article. Boolean operators are the lynch pins of the search strategy.

Trade-offs
Free text is ordinary language and is the natural way to search electronic databases using everyday terms and words. A better way of searching is to employ a â controlled languageâ for a particular database, using their specific search terms or medical subject headings (MeSH terms). A combination of free-text and this controlled language searching is advised in order to get the best results. Exploiting information resources effectively requires a trade-off between getting back too much or too little. The search strategy can be comprehensive or selective, two concepts related to search accuracy. A comprehensive search picks up many relevant reports, but also much unrelated material. A selective search however, will retrieve more relevant articles, but some important evidence may be missed. It is best to start with a broad search and then narrow the quest as you proceed. Using the trade-off to advantage, you can find the abstract or the full-text version of the required article and then print or save it. Software citation managers, like EndNote, can help store and sort the references.

To practice bedside, evidence-influenced medicine, we need to track down the best evidence and integrate it with the patientâ s unique biology, circumstances, and values. The initial steps of a search process involve selecting relevant databases and then identifying appropriate search terms and synonyms for the search.[5] It is then possible to search The Cochrane Library, MEDLINE, and EMBASE efficiently. Evidence, of course, is helpful but not sufficient in itself for making clinical decisions. However, when we ignore research evidence, we are often relying simply on the unique personal experience of just one individual. If treatments with compelling evidence from quality studies are used,[9] then patient outcomes are likely to improve positively and predictably.

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