

THOMAS FUCHS-BUDER

Département d'anesthésie-réanimation,
CHU Nancy/Brabois,
Nancy, France

Saturday May 28, 2005

17:00-17:45

Room H

The amount of medical information doubles every five years. For practicing clinicians, staying abreast of advances in medicine is becoming a major challenge. To continue to provide the best possible patient care, clinicians must have access to resources that will assist them in making clinical decisions. PubMed, a resource developed by the National Center for Biotechnology Information at the National Library of Medicine (NLM), provides free access to MEDLINE and other databases to any person who has internet access. MEDLINE is the NLM database of all published biomedical literature relevant to clinical practice. It is updated daily and contains more than 11 million references dating back to the 1960s from more than 4000 selected journals from 70 countries. Clinicians seeking information can search PubMed through Entrez, a text-based search and retrieval system at <http://www.pubmed.gov>. Entrez also provides access to other research-oriented databases.

PUBMED HOMEPAGE

The PubMed homepage <http://www.pubmed.gov> provides users with a Query box, a text box into which search terms are entered. The black menu bar above the Query box provides access to other databases. The homepage provides a Features bar that allows users to set Limits on searches and Preview the number of results that a research will retrieve before displaying the citations. The History feature is available after the first search and reviews the results of up to 100 prior searches. PubMed also provides users with an electronic Clipboard that can be used to compile up to 500 citations from multiple searches. The Clipboard erases the contents after 1 hour of inactivity. Users can visualize the search techniques employed by PubMed with the Details feature. The Features bar and Query box are available from every screen. PubMed also provides resources such as an Overview, online Help, and frequently asked questions (FAQ) on the blue sidebar on the left-hand side of each screen.

Citations are displayed from the newest to the oldest in a default Summary format. PubMed will search back to 1966 unless a date limit is specified. The drop-down menu Display allows the user the option of viewing the retrieved citations in a variety of formats. The number of citations is shown on the grey bar, and the first 20 are shown by default. More citations can be displayed by selecting the desired number with the drop down menu on the left. The number of pages of citations is also reviewed by selecting the blue numbers on the right. Users can save references and display them as a text file. This text file can be imported easily into commercially available reference manager software.

USING MESH TERMS TO CONSTRUCT SEARCHES

The language of medicine is rich. Concepts can be described by using a wide range of synonyms. MeSH (Medical Subject Heading) is NLM's hierarchical vocabulary that is used for indexing articles in PubMed, with more specific terms organized underneath more general terms. MeSH contains more than 19,000 terms and is updated annually to adapt to changes in medicine and medical terminology. Subject analysts examine each journal article indexed in PubMed and assign the most specific MeSH terms applicable, usually 10 to 12. This provides a reliable way to retrieve citations because it indexes articles based on content rather than on the words of the authors.

Two additional features of PubMed capitalize on the MeSH vocabulary and increase the search field, providing distinct advantages over other commonly used search engines. The first of these features of PubMed is "automatic term mapping". For each phrase that users enter into query line, PubMed attempts to translate the terms by matching them against term libraries in a consistent manner. PubMed first checks them against a library of MeSH terms, then journal names, then commonly used phrases, and finally against author names. If PubMed finds the term in one of these libraries, it conducts the search by using this phrase in the appropriate search field (i.e., author name field, MeSH term field, etc) and also searches for it as a text word in all search fields.

The second feature of PubMed that increases search yield is “automatic term explosion”. Journal articles are entered into PubMed with both MeSH headings and Subheadings. MeSH Subheadings are further grouped into families of subheadings (to see MeSH subheading categories, hyperlink to Help through the blue sidebar and see MeSH Subheadings and families of MeSH Subheading Explosions). When PubMed searches for a term, it automatically “explodes” or includes the more specific terms and all the MeSH Subheadings in the family of subheadings. This effectively increases the search yield. Any time during the search, users can see how PubMed has executed the search by selecting Details in the features menu.

AUTHOR

To search by an author’s name; the name is entered in the format of last name plus initials (no punctuation). PubMed automatically truncates the author’s name to account for varying initials and designations such as Jr. or 2nd. A name entered in this format will search in the authors’ field. If only the author’s last name is entered, PubMed searches the name in All Fields, except when the author name is found in the MeSH Translation table. To search for an author in the Author field when only the last name is available, qualify the author name with the author search field tag, [au].

JOURNAL TITLES

Journals may be searched by the full journal title, the MEDLINE abbreviation, the ISSN number, or the variant title as it appears in the NLM library. If a journal title is also a MeSH term, PubMed will search the unqualified term as MeSH. Qualify the journal title with the Journal Title search field tag, [ta]. Qualify single word journal titles with the Journal Title search field tag, [ta], because PubMed will search unqualified single journal titles as MeSH terms (if applicable) or as All Fields.

BOOLEAN OPERATORS

PubMed searches can be refined by using multiple search terms connected by Boolean operators: AND, OR, and NOT. Boolean operators must be entered in upper case. The operator AND selects the reference that contains both search terms; OR selects the references that contain either search term; and NOT selects the reference that contains the first term but not the second term. NOT should be used carefully, if at all. NOT is an absolute, and it can have unintended effects.

LIMITS

PubMed allows users to refine searches further by imposing Limits, including publication type, age and sex of research subjects, date of publication, language, human or animal, or journal subsets. The specific Limits are displayed beneath the Features bar. Placing Limits on the search decreases the number of citations that need to be reviewed to answer your clinical question. Clicking on a citation title “hyperlinks” (i.e., different-coloured text that links to other Web pages) to the abstract. The user can connect to the full-text article online by selecting the journal icon displayed at the top of the abstract display. In some instances, the article is available or may be after a certain period. In most cases, however, access to the full text is limited to those individuals and institutions subscribing to the electronic version of the publication.

SEARCH FILTERS

PubMed allows users to search for articles using Clinical Queries and Systematic Review search filters. These can be accessed through the Clinical Queries hyperlink on the sidebar at the left-hand side of the screen. Clinical Queries are validated search strategies to locate articles on therapy, diagnosis, aetiology, or prognosis. The “filters” or “hedged” are designed to allow clinicians to search by maximizing either the specificity or the sensitivity of the search. The Systematic Review search filter will locate articles identified as systematic reviews, meta-analyses, reviews of clinical trials, clinical reviews, guidelines, evidence-based medicine, and consensus development conferences. Either filter can be used by selecting the button in front of it. Search terms need to be entered in the Query box on the bottom of the Clinical Queries page. Searches can be further refined by imposing Limits on the retrieved citations.

CLINICAL QUESTIONS

The most successful searches are accomplished if users select the most precise terms for the search. Finding numerous; apparently irrelevant articles is likely to discourage the clinician from looking further. These terms are defined by learning to ask “well-built clinical questions”. Such questions are constructed by breaking down questions that arise from a clinical encounter into 4 components: (1) patient/problem, (2) intervention, (3) comparison intervention, and (4) outcome. These phrases can be used as PubMed search terms to retrieve relevant citations that will assist in making the appropriate clinical decision. At least 2 terms should usually be entered to begin the search, but more can be entered to increase search relevance.

ADDITIONAL FEATURES

PubMed provides all users with the option to register for the Cubby, which is a free of charge facility which allows users to store and update searches. First-time users must register and select a unique password for access. This resource might be used to conduct systematic reviews because it allows users to update searches quickly, which can then be kept in the Cubby indefinitely.

ADVANCED FEATURES

PubMed provides many other advanced features that will assist interested clinicians in finding the evidence necessary to make informed clinical decisions. Users should be encouraged to become more comfortable with the basic features and then to challenge themselves to use its advanced features. Help, Overview, and Tutorials are available through the blue sidebar on the left-hand side of the screen to help with all aspects of the system.