Sources of Evidence — MEDLINE

Jeyanthi John

Senior Researcher, Centre for Evidence-based Dentistry, Oxford, UK

MEDLINE (Medical Literature, Analysis and Retrieval System Online) is the US National Library of Medicine's premier bibliographical database. It concentrates on biomedical sciences and contains over 12 million references to journal articles in life sciences. It is searchable using a number of software packages and is freely available via the PubMed (National Center for Biotechnology Information, National Library of Medicine Bethesda, MD 20894, USA).

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Interface

MEDLINE is a database of bibliographical information in the life sciences and medicine which is published by the US National Library of Medicine (NLM). It contains citations from over 4600 international journals in 30 languages; indeed, 40 languages are included within older journals cited back to 1966. Just over half of the articles were published in the US and 89% of cited articles are written in English. Just over three-quarters of the included articles have English abstracts written by the authors. The MEDLINE citations are created by the NLM, its international partners and collaborating organisations.

The database includes research in the basic biomedical and clinical sciences from 1966, including nursing, dentistry, veterinary medicine, pharmacy, allied health and preclinical sciences. Since 2000, there has been increased coverage of the life sciences. New citations, with abstracts, are added weekly. The journals included in the database are selected for MEDLINE based on advice from the Literature Selection Technical Review Committee, a group of experts chartered by the US National Institutes of Health (NIH).

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MEDLINE can be accessed in a variety of way. Academics are probably most familiar with accessing MEDLINE via the commercial software packages SilverPlat-

ter WebSPIRS, Silver Platter WinSPIRS or SilverPlatter ERL, and the Ovid Web Gateway [Ovid Technologies, New York, New York, USA]. Alternatively MEDLINE can be accessed via PubMed, which provides internet-based and free access to MEDLINE through the NIH website at www.ncbi.nlm.nih.gov/pubmed/ (or at the shorter www.pubmed.gov). Which-ever package used, the same database is reached. Subtle differences between the packages, however, will be best understood by regular users of MEDLINE by

attending a course. As always with software packages, some people prefer using one to another, but because most practitioners can access the no-cost version, we outline here the basics of searching via PubMed (Figures 1–3).

Using PubMed

Begin by entering a word or words (the search term) into the query box near the top of the screen. Clicking on the “Go” button next to the query box or pressing the “Enter” key on your keyboard starts the search, resulting in the retrieval of a number of articles. This method of searching using a single word or word is called “Text word” searching and the database searches only for published work containing that particular word. An alternative method of searching is to use index terms that have been assigned to describe the main topics in an article.

Figure 1. Ovid gateway to MEDLINE.

Figure 2. WinSPIRS gateway to MEDLINE.

Figure 3. PubMed Gateway to MEDLINE.

This type of searching is called “Thesaurus searching”. The thesaurus in MEDLINE is called MeSH (Medical Subject Headings).

If you use the Boolean operators AND, OR and NOT, they must be entered in upper case — it may be helpful to keep your keyboard’s “Caps Lock” button

switched on and type all the search terms in upper case. Note that, unlike the Cochrane Library, PubMed does not recognise the operator NEAR.

To search for a particular author, enter the last name and initials without punctuation eg, “smith j” or “smith jd”. This will limit the search to the author field ie,

only author names will be searched to find a match rather than text words or titles.

Truncating words and using an asterisk at the end of the term allows searches for all terms that begin with the word (eg, “dentist*” retrieves articles containing the terms dentist, dentists and dentistry). If there are more than 150 variations to a truncated term, PubMed searches for the first 150 variations. A warning note is displayed if this happens and you have the option of lengthening the term to reduce the number of variations.

Focusing the search

Clicking on “Limits” on the bar directly beneath the query opens up a further screen which prompts you to focus your search. You can then restrict the search in a number of different ways, such as to specific age-groups, human or animal studies, or to specific publication types (eg, clinical trial or meta-analysis). You can decide on a range for publication dates using the “From” and “To” sets of boxes, or the date the publication was added to PubMed (the Entrez date), from 30 days to 10 years previously.

Using the “Preview/Index” button displays the number of records retrieved without displaying the records. This gives you the opportunity to refine your search strategy, for example by limiting the search or adding additional search terms.

You can view your search history by clicking on the “History” button. The searches will be numbered and listed in the order you performed them with the number of citations retrieved displayed for each one. You can combine your searches using the Boolean operators AND, OR and NOT. For example, typing “#2 AND #3” will combine your second and third searches (see Figure 4). You can clear the search history at any time by clicking on “Clear History” at the bottom left-hand corner of the “History” screen.

The citations retrieved can be selected by clicking on the little box to the left of each title. Alternatively you can send them to the Clipboard by ticking the boxes next to the titles then select “Clipboard” from the pull-down “Send to” menu.

To view your selections at any time, select “Clipboard” from the menu bar. You can further select citations from the

Figure 4. Combining searches using Boolean Operators 'AND' and 'OR'.

Clipboard to save into your own file. Repeat the earlier steps but select "File" from the pull-down menu. You can then save the citations as a text document for import into a database such as Reference Manager, ProCite or EndNote (ISI ResearchSoft, Carlsbad, CA 92009, USA). You can store up to 500 items on the Clipboard but remember that citations will be lost from the Clipboard after 8 h of inactivity.

You can view your search strategy in PubMed's syntax using "Details". Error messages are also displayed here.

Viewing search results

Your citations can be displayed in various formats. Select the required option, eg, "Summary" or "Abstract" from the pull-down "Display" menu. Click on the "Display" button to view your citations in the selected format. You can do this in the original search screen or on your Clipboard, and move back and forth between different display options.

Citations can also be sorted differently, according to author, journal or publication date. Select the option you want

from the "Sort" pull-down menu. Remember to click on the "Sort" button to organise the display.

Using the "Related Articles" link to the right of each citation pulls up a list of articles that are closely related to the selected articles. The related citations will be ranged from most relevant to least relevant. This is a handy way to look up more articles that may be useful.

Looking for particular articles

PubMed has a facility to help you look up a particular article or set of articles using the "Single Citation Matcher" or "Batch Citation Matcher". These are listed under "PubMed services" on the bar on the left of the screen.

"Single Citation Matcher" presents you with a form in which to enter bibliographical information of the article for which you are looking. You can enter all or part of the information.

"Batch Citation Matcher" allows you to retrieve a number of articles at once. There is no form but you need to enter the bibliographical information in a

specified format that is described on the screen.

Other features

For more interested users, PubMed has a variety of other features, including a facility to store searches and a MeSH database to help you build a search strategy. The PubMed Help page describes all the facilities in simple user-friendly language.

Advantages and disadvantages

PubMed is a simple way of searching for articles on MEDLINE. MEDLINE itself indexes a wide variety of journals including many specialist journals. This is generally adequate for the vast majority of searches. Nevertheless, MEDLINE does not index all biomedical journals. Currently, about 4600 journals are referenced whereas it is estimated that there are more than 30 000 biomedical journals available world-wide. Therefore, if a more exhaustive search is necessary, eg, for a systematic review, it may be necessary to check for articles that are not indexed in MEDLINE or indeed in any electronic database.

Summary

It is useful to plan your search before you begin. When using PubMed, start with a broad search, using both Text word and Thesaurus searches. This will minimise the possibility of missing out relevant articles. Careful combination of searches using Boolean operators can be useful at this stage. You can then gradually focus your search by adding in additional terms or limits.

If you want to keep any articles for future reference remember to save them into a separate file before you log out!