

## HOW TO CONDUCT A LITERATURE SEARCH?

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### Why do you need to search the literature?

You have already read from previous article in this series that research is an attempt to generate new knowledge. Therefore, the initial step of your research process is to determine whether the research question you have identified has already been answered by somebody else. Don't despair if this turn out to be the case! It is perfectly all right to replicate research conducted elsewhere to show that the same applies in this country - this will strengthen the validity of the original finding. Often, you can learn from the methods of previous investigators or even improve upon them. Your literature review may help you to refine your research question or lead to a change in the focus of your research.

### Where to find the literature?

Access to a good medical library is essential for a thorough literature search unless you can afford to pay somebody to do it for you. You may want to become a member of a university library to gain access to its collections, not just for the medical journals, but also for the books, monographs, reports, dissertations, and theses - all of these can provide important pieces of information for your research project. It is also wise to contact investigators who have conducted research in this topic as they can tell you whether your research project is worth pursuing and to point out to you useful reference works that you can refer to.

With the advent of the internet and electronic publishing, a great deal of information is now accessible via the web. Searching the internet using a browser (e.g. Google <http://www.google.com/>) may turn up useful articles but you may have to plough through many hits that are off the mark. It is preferable to search the information services specific to your research area, e.g. databases, electronic journals, and professional society websites. As medical journals are the primary repository of research works, the rest of this article will focus on how to look for relevant research articles from the medical journals.

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### Using databases

There are currently about 20,000 medical journals being published each year. It can be difficult to search through such a huge pile of printed journals. Fortunately, abstracts of most of the articles now reside in electronic depository called databases. There are many databases with different focus; the most commonly used one is PubMed. Examples of other more specialised databases: Embase (pharmacology, toxicology focus), CINAHL (nursing and paramedical literature), ERIC (education), PsychLit (psychology and psychiatry), etc.

### Searching PubMed

PubMed (<http://www.pubmed.gov>) is the internet version of MEDLINE - a collection of journal citations maintained by the National Library of Medicine (NLM), USA. Its citations come from about 4000 medical journals stretching back to 1955 - the number of citations in 2005 has exceeded 12 millions. A typical citation consists of the journal article's title, author name, author affiliation, journal name, abstract, MeSH terms, and other information. To exploit fully the usefulness of PubMed, you may want to take a course in searching skill or consult a medical librarian. Merely typing some words in the search box and click "Go" may retrieve either far too many or too few hits.

Some useful searching tips are as follow:

- Identify the key concepts in your research area and combine several keywords at the search box.
- Use MeSH terms and subheadings where available - Medical Subject Headings (MeSH) is a list of 20,000 special vocabulary created by NLM to index articles included in MEDLINE. For example articles about colon cancer, rectal carcinoma, tumours of large bowel, etc are classified as "colorectal neoplasms". MeSH subheadings are concept terms that define the article further (e.g. therapeutic use, diagnosis, epidemiology). You can check the appropriate MeSH term for any medical word by looking it up at MeSH database (on the right side of PubMed homepage).
- Use Boolean operator - these connectors (AND, OR, NOT) should be used in upper case, are used when you have more than one search term.

The operator AND selects citations containing both search terms, the operator OR broaden the search to citations containing either search terms, while the operator NOT includes citations containing the first search term but excludes citations containing the second search term. In PubMed, the default search strategy is always AND when multiple search terms are typed into the search box without using Boolean operator.

- Use Limits - these are search filters that narrow down your search by specifying the publication type, age, language, gender, year of publication, etc.

Example of a PubMed search (accessed 23<sup>rd</sup> Nov 2005)

You wish to conduct a study to determine the usefulness of screening for diabetic retinopathy using fundus photography in general practice. A search of

the MeSH database revealed that appropriate MeSH terms are "diabetic retinopathy", "photography", "mass screening", and "family practice".

#1 to #4 shows that by combining these MeSH terms using the Boolean operator "AND" (this must be in CAPITAL), the number of citations retrieved is progressively smaller (but more targeted).

#5 to #8 shows how you can combine MeSH term with MeSH subheading and applying Limits. In #5, "epidemiology" is a subheading. In #6 (as in #4), the addition of the MeSH term "family practice" reduces the number of citations considerably (suggesting that few such studies are conducted in the primary care setting). In #7, #5 is combined with Limits (i.e. limiting the citations to those concerning adults, published from 2000 onwards and written in English). In #8, same as in #7 but limiting further to clinical trials.

Search	PubMed Queries	Result
#1	Search diabetic retinopathy	14518
#2	Search diabetic retinopathy AND photography	740
#3	Search diabetic retinopathy AND photography AND mass screening	146
#4	Search diabetic retinopathy AND photography AND mass screening AND family practice	11
#5	Search diabetic retinopathy/epidemiology	1367
#6	Search diabetic retinopathy/epidemiology AND family practice	22
#7	Search #5 Field: MeSH Major Topic, Limits: All Adult: 19+ years, Publication Date from 2000, English	299
#8	Search #5 Field: All Fields, Limits: All Adult: 19+ years, Publication Date from 2000, English, Clinical Trial	14

### Searching medical journals

With electronic publication of medical journals, it is now more efficient to find research article via database (e.g. PubMed) or electronic journal publishers and follow the link to the full text of the article you want. Browsing the print journals is now primarily limited to journals without electronic version, or when you need to search older journal issues published in the pre-electronic era. There is a wide variety of electronic journal publishers - they vary considerably in their journal collections and searchability. Some of them combine database, books, journals and other information sources (e.g. guidelines), into a single search interface. While most of them allow free access to the abstracts, only a limited access to free full text is availability. Some examples of the larger electronic journal publishers are: Ovid, Proquest, ScienceDirect, Synergy Blackwell, and Highwire Press. You may also search the individual electronic journals (e.g. New England Journal of Medicine, BMJ, Family Practice etc).

### Finding local references

PubMed searching for Malaysian papers will be able to retrieve articles published in the two Malaysian journals (Medical Journal of Malaysia, Malaysian Journal of Pathology) indexed in PubMed as well as

local papers published in other indexed journals. To find other Malaysian publications, you can try the following:

- Access the online catalogue of local university library - some of them also catalogue the publications of Malaysian authors.
- Check the bibliographies of Malaysian publications, e.g. Bibliomed-SM, Bibliography of Primary Care Research of Malaysia (contact A/Prof EM Khoo, khooem@um.edu.my).
- Do hand search of non-indexed local medical journals.

### Finding full text articles

Full text articles are offered free electronically by many journals, sometime at the point of publication, and occasionally the journal become free between six months to 2 years after publication. A list of family medicine journals with full text availability without charge is available from the author. For certain journals where your institution do not subscribe to, several payment mode may be possible (e.g. pay-per-view).

### Critical appraisal and writing literature review

Having obtained the full text, you will need to read through the paper critically to determine their relevance to your research topic and quality. You will

need to pay particular attention to the method section to determine how the study was conducted. If appropriate you may decide to adapt the method to the local setting. You will need to write a concise review of the literature you have identified in the research proposal, while a more lengthy description is needed for the research dissertation (you will need to include your method of searching for the literature).

#### Further readings and websites

1. Ebbert JO, Dupras DM, Erwin PJ. Searching the medical literature using PubMed: a tutorial. *Mayo Clin Proc.* 2003 Jan;78(1):87-91. [[PubMed](#)]
2. Guglani L, Gupta P. Effective PubMed search. *Indian Pediatr.* 2001;38:621-9. [[Full text](#)]
3. PubMed tutorial. National Library of Medicine. [http://www.nlm.nih.gov/bsd/pubmed\\_tutorial/m1001.html](http://www.nlm.nih.gov/bsd/pubmed_tutorial/m1001.html) (accessed 23<sup>rd</sup> Nov 2005)
4. Kirkham C, Grzybowski S (ed). How to do research. Research Office, Department of Family Practice, University of British Columbia. [[Link](#)]
5. Locate & evaluate reference material; write a literature review. University of Medicine and Dentistry of New Jersey. [http://www.umdnj.edu/idsweb/gsc/bib\\_inquiry.htm](http://www.umdnj.edu/idsweb/gsc/bib_inquiry.htm) (accessed 23<sup>rd</sup> Nov 2005)
6. Ebenezer C. Literature searching for research. Lambeth Research Forum, 14<sup>th</sup> Feb 2002. [http://eprints.rclis.org/archive/00002224/01/Literature\\_Searching\\_for\\_Research.ppt](http://eprints.rclis.org/archive/00002224/01/Literature_Searching_for_Research.ppt) (accessed 23<sup>rd</sup> Nov 2005)