

Chapter 3. A literature search/review

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“Searching is half the fun: life is much more manageable when thought of as a scavenger hunt as opposed to a surprise party.” – Jimmy Buffett

Objective: To teach a practical way of doing literature searches that will allow the learner to obtain a sufficient, as defined by at least four, resources to begin formulating a research idea and to outline current resources available to further aid their search.

When in doubt, ask your medical librarian for help.

What is a literature search? A methodical search for all of the literature published on a topic.

Why do a literature search? Literature published on your topic will identify how others approached it and what they found. This information is valuable for several reasons.

- What has been done can guide how you build your research plan, from sample size to how results are defined or measured. Even if your study has already been done, it may still be worth repeating. Expanding the breadth (more end points) or depth (larger sample) of your original plan might take it from simple reproduction (less likely to get published) to advancing the knowledge base (more likely to get published.) Using terms as commonly defined in the literature makes your work more accessible, hence, more likely to get published (see MeSH, *infra*).
- Many authors will end their conclusions with recommendations for future research – which can give insight into questions about your topic that your community wants answered, and may lead you to modify your project to include them.
- The search results are also a list of journals that are interested in your topic, hence more likely to publish your work.
- Authors that have published on your topic can make ideal co-investigators and also be identified as potential reviewers.

What is a source of information?

A primary source provides direct evidence; in medicine typically results of direct observation or experiment outcomes. Citations in a published work should almost always be from a primary source. A secondary source is that which discusses or evaluates someone else’s primary source. These can give insight into how other research has been critiqued, and sometimes give a very

good overview of a topic. If you are explicitly referencing the analysis a secondary source is an appropriate reference. If there is data in a secondary source that you wish to reference, follow that source's references to the primary source; make sure that source actually says what it was reported to have said, and reference the primary source.

Where to search for sources?

There are many specialty-specific databases; the (not exhaustive) list below includes some of the more commonly used general databases.

Google (<http://scholar.google.com/>) The (giant) new kid on the block. Google's search engine includes many peer-reviewed journals across many disciplines, but not every publisher allows their content to be searched in this way. This should not be your only search, but can be useful in getting started, broadening a search for very rare things, and for identifying non-medical disciplines that may have published on your topic.

PubMed (<http://www.ncbi.nlm.nih.gov/pubmed>) A data base that includes the MEDLINE database (MEDLINE is the U.S. National Library of Medicine (NLM) premier bibliographic database), life science journals and online books. It has easy-to-use tutorials (<https://learn.nlm.nih.gov/rest/training-packets/T0042010P.html>).

The Cochrane Library (<http://www.thecochranelibrary.com>) A database of systematic reviews; considered very strong for finding evidence-based clinical practice recommendations.

EMBASE (<https://www.elsevier.com/solutions/embase-biomedical-research>) A biomedical literature database; considered very strong in pharmacology, drug research and toxicology.

Trip! (<https://www.tripdatabase.com/>) A clinical search engine that uses a ranking algorithm to search a limited number of "highest quality" sources.

Ovid (<http://www.ovid.com/site/index.jsp>) A commercial publisher and vendor of various research databases – used by many University systems.

What are keywords and MeSH?

These are the language of searching. Keywords represent a primary concept. These can be generated from your research question. For example, if my research question is, "Is there a difference in glycemic control between intravenous detemir and glargine in the elderly," keywords might include: "glycemic control", "detemir", and "glargine." For this question, there are several implied keywords that might be useful, like "diabetes management" or "hyperglycemic management." Keep in mind synonyms (e.g. "old person", "geriatric", "geriatric

patient” are all synonyms of “elderly”), and acronyms (e.g. “DM2”, “T2D” are acronyms of type two diabetes.)

Medical Subject Headings (MeSH) (<https://www.nlm.nih.gov/mesh/>) are hierarchically-organized terms used by PubMed and other U.S. National Library of Medicine databases. These make searches easier, and help ensure common terminology for a given issue. You may be asked to provide MeSH identifiers (or just keywords) for your article; these should be similar to terms used by published articles on your topic. That makes sure people searching your topic will find your publication. The MeSH website has useful tutorials on how to use MeSH for better results. Many authors will also clearly describe their literature search by including MeSH used in their searches.

How do I search?

See the step-by-step guide at the end of this chapter – it’s that easy and there’s no need to duplicate it.

How do I expand the search?

Sometimes a search will yield zero or few results. If zero results, make sure you are not using operators (like “and”); these are great filters, but decrease results. You can also repeat your search in a broader database, ultimately simply searching the internet using Google. Returns on these searches may give you other, more search-friendly terms to describe your topic. They may also identify authors or speakers who are considered experts on the topic. A PubMed Author Search of those persons may identify articles on your topic.

If the search yields at least one but not enough results, enter more terms related to your topic, make sure you are using terms from the MeSH library, and enter synonyms for your topic. You may also find more searchable terms by reading articles cited in the results you do get. If using PubMed, click the “Similar Articles” link.

How do I contract the search?

Sometimes a search will yield too many results to be useful. In this case, replace general terms with specific ones (e.g. “diabetes mellitus type 2” instead of “hyperglycemia”). You can also simply add more terms to your search, or add operators like “and” to your search. Using an operator limits search results to those articles that meet all the criteria you define (e.g. [“diabetes mellitus type 2” AND detemir AND glargine AND management] requires each of those elements and will yield fewer results than “diabetes.”) Search engines have other operators that can require two words next to each other or within a certain number of words from each other, an exact phrase, or specific terms in different parts of an article.

Abstract vs article

Often the abstract is presented, but the full article is retained by the original publisher. You must read the entire article before citing the publication as a reference! Your institution's medical librarian will have access to the full work; just send her an email with the citation and ask for a copy. You may also be able to access the article for free through the journal's web page or through a university library account you may have access to through your university or medical school. You can also limit your searches to those with "free full text" available (can be useful for getting started but by itself is **NOT** an adequate literature search.)

Citations

Identify the style of references used by your preferred journal of publication. Keep detailed, accurate citations in that format as you search. It is useful to record all authors even if your preferred publication limits the number of authors to list. Although you will have to go back and remove some when you submit, this prevents a lot of re-work in the event you ultimately submit to a journal that requires all authors to be listed.

Keep copies of each paper you may use. This is particularly useful when a reviewer requests further information about a citation or challenges the work cited.

Keep an electronic worksheet of outcomes you are interested in with the citation. When you are done writing your paper, cut and paste the citations into your reference section as you cite them.

Summary Points:

- ❖ A literature search is a methodical search for all the literature published on a topic.
- ❖ Medical databases have different strengths and weaknesses; choosing the best suited will make for a better search.
- ❖ Describing a topic in MeSH terms makes a literature search easier; publishing work using MeSH terms makes it more accessible.
- ❖ Search results can be expanded, modified, and filtered to ensure a usable amount of relevant search results.
- ❖ Tracking key points from each article with that articles' proper citation will help organize concepts and limit the need to re-read articles.
- ❖ When in doubt – ASK YOUR MEDICAL LIBRARIAN!

References

All web sites accessible as of July 2017

https://www.ncbi.nlm.nih.gov/books/NBK3827/#pubmedhelp.How_do_I_search_PubMed

<https://www.nlm.nih.gov/mesh/>

<https://www.tripdatabase.com/>

<https://www.elsevier.com/solutions/embase-biomedical-research>

<http://www.thecochranelibrary.com>

<http://www.ncbi.nlm.nih.gov/pubmed>

<http://scholar.google.com/>

How to perform a Literature Search – Using PubMed

For this recipe you will need:

- ❖ *Access to a computer with internet capabilities*
- ❖ *A subject that you wish to know more about or a scholarly question*
- ❖ *An email address*
- ❖ *The location of the nearest medical librarian to whom you may have access*

Step 1: Identify the key concepts for your search.

Example: What role does pain have in sleep disorders?

The key concepts are:

1. Pain
2. Sleep Disorders

Step 2: Go to: <https://www.ncbi.nlm.nih.gov/pubmed/>

Step 3: Enter the terms (or key concepts) in the search box.

Step 4: Look at the suggestions that display as you type your search terms. Is it what you are looking for? You may be able to click one to give you a better search.

Step 5: Click “Search”.

Step 6: Select “Filters” on the left hand side of page

Examples: 5 years, Human, English (There are many filters available. These can be used as tools to narrow your search results.)

Step 7: Select articles you want by clicking in box next to article title.

Step 8: Click on “Send to” (upper right corner of page).

Step 9: Select “Clipboard”, then “Add to Clipboard” (This enables you to run other searches on the same topic and add selected titles to the Clipboard- before saving to your email. (The clipboard only holds items for 12 hours so you need to send them to your email when you finish so you don’t lose them).

Step 10: When finished searching your topic, click on “Clipboard” (upper right corner of page).

Step 11: Click on “Send to” (just to left of Clipboard).

Step 12: Select “Email”; click on “Number to send” and make sure the number is higher than the number of titles you selected; type in your email address and enter a subject title in Subject box. (If you register as a user on PubMed you also have the option of sending to a “collection” for personal use.)

Step 13: Check your email for your search.

Step 14: Keep detailed records of all your searches so that you can reproduce them.

** Note: this is a very basic recipe using PubMed to get started. Work with your medical librarian to develop how-to guides for other databases.