

## Conducting Research: Seven Basic Steps

Step 1: Formulate a Research Question

Step 2: Identify the key concepts of your research question

Step 3: Create initial search statement(s)

Step 4: Look for background information on your research topic

Step 5: Look for journal articles on your topic

Step 6: Look for additional "grey" literature

Step 7: Evaluate what you have found

### Step 1. Formulate a Research Question

Articulating the question you are attempting to answer is the first step in any information seeking process. Write out your research topic or question(s) in sentences.

### Step 2. Identify the Key Concepts of your Research Question

Break your information into key concepts or topics. Separate out the "how", "who", and "what" aspects. Think of synonyms, phrases, and alternative spellings. Use broader or more specific terminology to describe a concept. These will be the keywords you use in searching Library catalogues, journal indexes, or even on Google. Also consider how you will limit or expand your focus depending on the initial search results.

Create a "living" list (a concept map) in a notebook that is readily accessible. The list should continue to grow as you search and learn more about the terminology used in your research area.

Example of a concept map:

Concept 1	Concept 2	Concept 3	Limits
The Disease	Disease	Issue focus	
Endophthalmitis	Bacterial	Ocular	Review journal articles
Panophthalmitis		Eye	1-2 years
ophthalmitis		Vision	English language articles
		optometry	

### Step 3. Put it all together: initial search statements

Most library catalogues, journal indexes and Web search engines have a simple keyword search interface that facilitates the "type every conceivable keyword you can think of into the input box" strategy. If you follow that strategy, matching algorithms in the index program will look in every field in every index record for every term, usually producing a mass of unrelated results. However, if you apply Boolean operators (AND, OR, NOT) and some other basic symbols, you will be able to "force" the index program to apply your logic to the searching. You should have a quick look at the specific index help before applying these operators to make sure the program

will understand them. Some catalogues, indexes or Web search engines may not allow all of the ones listed below.

**OR** – tells the program that these are different words for the same concept. Example: ocular OR eye OR vision

**AND** – tells the program to combine these different concepts together. Example endophthalmitis AND vision

**NOT** – tells the program to exclude the term following the “NOT”. Use sparingly! Example (ocular OR eye) NOT vision

Phrase searching – allow you to search words as one unit. Check the index HELP to determine how phrases should be entered. Some indexes automatically search words entered together as a phrase. Examples: “bacterial endophthalmitis” / bacterial endophthalmitis

Parentheses – as in mathematical equations, the program will handle everything inside the parentheses first. Example: (endophthalmitis OR panophthalmitis) AND vision

Wildcard symbols – Search the root of the word and possible endings. In Medline and PsycINFO the truncation symbol is \* Example: vis\* for vision, visual

Field searching – a journal index lists the specific details about a journal article in fields.

Keyword searching will match the word in your search against a number of fields (author, title of article, abstract, descriptors). Searching on a specific field is a good way to narrow or refine your search. Check the index HELP for more information.

#### **Step 4. Look for background information**

Search for books on your topic, search [TRELLIS](http://trellis1.tug-libraries.on.ca/) (<http://trellis1.tug-libraries.on.ca/>), the library catalogue, which lists all the resources in the university. You might not find a book dealing exclusively with your topic, but you may find one with a broader focus that includes information you want.

When writing a case report, general books on disease or differential diagnosis will provide valuable background information.

#### **Step 5. Look for articles on your topic: use a Journal Index**

Use the databases online and the librarians at the medical library.

#### **Step 6. Look for additional “grey” literature**

Comprehensive searching involves looking beyond book and journal literature to the “grey literature”. Grey literature refers to literature that is not widely published such as reports from societies, theses, and government reports.

### **Step 7. Evaluate what you have found**

It is important to assess the success of your research search process and the appropriateness of materials found. Producing effective search results isn't easy.

Identification of new concepts or terminology and revising and re-searching are part of even the most experienced researcher's search process. It is important to identify strategies to handle too much success or not enough. Here are some strategies to help you "modify on the fly."

- Modify Search Terms
  - Add another concept (useful when narrowing your search)
  - Eliminate one of the more generic terms in your search (useful when narrowing your search)
  - Eliminate one of the concepts from your search (useful when broadening your search)
- Use truncation to capture the variant endings of a keyword by applying limits
  - Limit to review articles. Review articles do not present new research findings but provide an overview or summary of research on a specific topic. This is useful as a starting point as it builds your knowledge of a topic.
    - Limit to articles on an age group or gender
    - Limit to English only journals
    - Limit to a range of publication dates. Search the last five years and then expand later
  - Use controlled vocabulary Controlled vocabulary, also referred to as subject headings or descriptors, is a list of constant terminology used by the producers of an index to describe subjects. It reduces the guesswork of what terminology an author may have used to describe a topic.
  - Track Related Articles – If you can identify a few good review or research articles, you can use these articles to help track other related research.
    - Search for other articles by that author
    - Follow up on the article's bibliography (or list of references)
    - Use the "related article" feature some indexes provide
    - Use a citation index to find more recent articles that have cited that paper

Don't give up! Get help If you have gone through these 7 steps and have not been successful in identifying books, journal articles, or Web sites relevant to your question, then it is time to get help from an expert searcher.