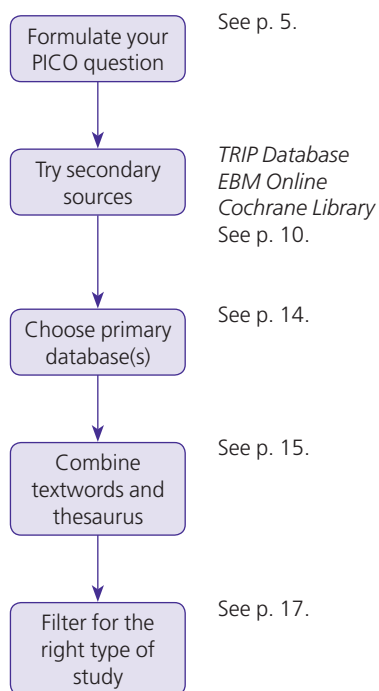


Finding the evidence: how to get the most from your searching



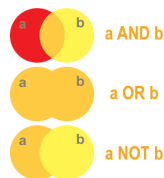
See p. 5.

TRIP Database
EBM Online
Cochrane Library
See p. 10.

See p. 14.

See p. 15.

See p. 17.



Convert your question to a search strategy

Identify terms that you would want to include in your search:

Patient or problem	Intervention	Comparison	Outcome
Male, aged 55 Smoker Acute coronary syndrome	Low molecular weight heparin	Unfractionated heparin	Recurrence of angina, mortality

Generally, it helps you to construct a search for each concept separately, then combine them.

Think about what kind of evidence you need to answer your question:

- 1 Levels of evidence (see p. 94): what type of study would give you the best quality evidence for your question?
- 2 Secondary sources: is there a quality and relevance-filtered summary of evidence on your question, such as in *ACP Journal Club* or *Clinical Evidence*?
- 3 Systematic reviews: is there a systematic review in the *Cochrane Library*?
- 4 Bibliographic databases: in which database would you find relevant studies?

1 Try these first

TRIP Database http://www.tripdatabase.com	Use general subject terms (e.g. prostate cancer)
EBM Online http://ebm.bmjournals.com/	Use advanced search; enter specific key words (e.g. prostatectomy)
Clinical Evidence http://www.clinicalevidence.com	Search or browse
Cochrane Library http://www.thecochranelibrary.com	Search (see p. 13)

These sources will give you the best return on your precious time.

2 Secondary sources

Of course, if someone has already searched for and appraised evidence around your question, it makes sense to use that information if possible.

Type	Description	Source
Critically appraised topics (CATs)	Appraisals of evidence in response to clinical questions	CATCrawler Journal clubs Your and your colleagues' own collection
Evidence-based summaries	Reviews of the evidence around a specific clinical topic	Bandolier, Clinical Evidence (www.clinicalevidence.com)
Structured abstracts	Appraisals of important clinical papers	EBM Online, ACP Journal clubs, evidence-based journals
Health technology assessments	Appraisals of the evidence for a specific intervention	Cochrane Library UK NHS HTA Programme
Systematic reviews	Review of all the evidence around a specific topic	Cochrane Library

A note about guidelines

An authoritative, evidence-based guideline would give you the best starting point for your search. However, we have assumed that your questions tend to be the ones that aren't answered by the guidelines. Also, it's important to bear in mind that not all guidelines are 'evidence-based' (Grimshaw 1993; Cluzeau 1999).

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Good sources include:

TRIP Database	http://www.tripdatabase.com
UK National Library for Health	http://www.library.nhs.uk/
UK National Institute for Clinical Excellence	http://www.nice.org.uk/
Scottish Intercollegiate Guidelines Network	http://www.sign.ac.uk/
Canadian Medical Association	http://mdm.ca/cpgsnew/cpgs/index.asp
New Zealand Guidelines Group	http://www.nzgg.org.nz/
US National Guideline Clearinghouse	http://www.guideline.gov/

The screenshot shows the TRIP Database search page. A search bar contains the text 'radical prostatectomy'. Below the search bar, there are callouts: 'Type your search here' pointing to the search bar, 'TRIP displays your results here, categorized by database' pointing to the search results area, and 'Note that TRIP searches Medline using Clinical Queries and a 'Big 4' filter (BMJ, JAMA, NEJM and The Lancet)' pointing to the search options. On the right, there is a 'Results by Category' section with a list of categories and their counts: Evidence Based (16), Guidelines (0), Query-answering services (0), E-Textbooks (3), Medical Images (98), Patient Information Leaflets (0), MEDLINE articles, Therapy Articles, Diagnostic Articles, Etiology Articles, Prognosis Articles, and Big 4.

Can I trust this secondary source?

Only if you can answer 'yes' to all of the following:

- There are no conflicts of interest.
- It clearly states what question it addresses.
- There is an explicit and evidence-based methodology behind finding, producing and checking the information.
- The source is reviewed and updated regularly.

Critically appraised topics (CATs)

CATs are appraisals of the evidence found in response to a clinical question. They are a very useful way of organizing your own appraisals and sharing them with your colleagues. Many people use them to help run evidence-based journal clubs. Many people now make their CATs available on the web and you might like to start searching here. You should be wary, however, of the provenance of these CATs.

- CATmaker: <http://www.cebm.net>
- CAT Crawler: http://www.bii.a-star.edu.sg/research/mig/cat_search.asp

Evidence-based summaries

Evidence-based summaries are reviews of the evidence around a specific clinical topic. The findings of studies and systematic reviews are presented as answers to the clinical questions associated with that topic. However, they tend to be evidence driven (telling you what there's good evidence for) rather than question driven (telling you what you need to know).

- Clinical Evidence: <http://www.clinicalevidence.com>
- Bandolier: <http://www.jr2.ox.ac.uk/>

Structured abstracts

Secondary journals, such as *Evidence-Based Medicine*, publish structured abstracts which summarize the best quality and most clinically useful recent research from the literature. This is an excellent way to use the limited time at your disposal for reading. Recently, the BMJ have launched an 'alert' service which sends you an email when new abstracts are published that interest you.

- BMJ Updates: <http://bmjupdates.mcmaster.ca/index.asp>
- EBM Online: <http://ebm.bmjournals.com/>

Health technology assessments (HTAs)

HTAs are assessments of the effectiveness and cost-effectiveness of health care interventions. This includes procedures, settings and programmes as well as specific drugs and equipment. The NHS HTA Programme database is included in the Cochrane Library but can be searched directly at <http://www.ncchta.org/index.htm>.

Systematic reviews

We'll look at SRs in more detail on p. 27. The Cochrane Library contains the full text of over 4,000 systematic reviews so it's a great place to start searching.

Note, however, that systematic reviews are found elsewhere – a recent comprehensive search for systematic reviews in cancer alone found 16,000 references (Healy 2005) – and you should search primary databases if you want to find all of the reviews in your area.

The Cochrane Library is composed of a number of different databases:

The Cochrane Database of Systematic Reviews	Full text systematic reviews prepared by the Cochrane collaboration
Database of Abstracts of Reviews of Effects (DARE)	Critical appraisal of systematic reviews published elsewhere
The Cochrane Central Register of Controlled Trials	The largest register of controlled trials in the world
The Cochrane Database of Methodology Reviews	Full-text systematic reviews of methodological studies
The Cochrane Methodology Register	A bibliography of methods used in the conduct of controlled trials
Health Technology Assessment Database	Reports of health-care interventions effectiveness
NHS Economic Evaluation Database	Economic evaluations of health-care interventions
About the Cochrane Collaboration	Methodology and background papers for the Cochrane Collaboration

Once you've done your search you can browse the results in each of these databases.

The screenshot shows the Wiley InterScience search page. At the top left, it says 'WILEY InterScience Home / Medicine and Health'. The main search area is titled 'SEARCH IN THIS TITLE The Cochrane Library'. It features a search box with a dropdown menu set to 'Search All Text' and a 'Go' button. Below the search box are several links: 'Cochrane Advanced Search', 'MeSH Search', 'Search History', 'Saved Searches', and 'Search Tips'. A navigation menu on the right includes 'HOME', 'ABOUT US', 'CONTACT US', and 'HELP'. A blue vertical bar is present on the right side of the page.

Information available on the Cochrane collaboration

Basic system help

1. Click into the search box and type in a word or phrase
2. The pull-down list can be used to limit the search to the following fields: All text, Record title, Author, Abstract, Keywords, Tables, Publication type, Source and Date.
3. Click on Go to run your search

Access the full search feature

Use MeSH for a thorough search with thesaurus terms

Use history to build a complex search; you can also save your search for later.

Use these links for more detailed search instructions.

Use Boolean operators to combine search terms:
 Use AND, OR, and NOT to create a more complex search.
 Remember British and American spelling e.g. haemorrhage or hemorrhage
 Use truncation*

the cochrane library

BROWSE ARTICLES BY

4. Click to retrieve relevant results

Cochrane Reviews | DARE | CENTRAL | Methodology Reviews | Methodology Register | HTA | NHS EED | About | Topics

3 Primary sources

At some point you will find yourself searching the massive collections of bibliographic records available in online databases.

Choosing the right bibliographic database(s)

Database	Coverage
CINAHL	Nursing and allied health, health education, occupational and physiotherapy, social services
MEDLINE	US database covering all aspects of clinical medicine, biological sciences, education and technology
EMBASE	European equivalent of MEDLINE, with emphasis on drugs and pharmacology
PsycLIT	Psychology, psychiatry and related disciplines, including sociology, linguistics and education

Search strategies for MEDLINE and other bibliographic databases

There are two main types of strategy for searching bibliographic databases: *thesaurus searching* and *textword searching*. You need to combine both of these to search these databases effectively.

Why do we need both of these?

Unfortunately, the index may not correspond **exactly** to your needs (and the indexers may not have been consistent in the way they assigned articles to subject headings); similarly, using textword searching alone may miss important articles. For these reasons, you should use **both** thesaurus and textword searching.

Most databases allow you to build up a query by typing multiple statements, which you can combine using Boolean operators (see below). Here is an example from PubMed (www.pubmed.gov).

Question: In patients who have had a heart attack, does simvastatin reduce mortality?

Patient or problem	Intervention	Comparison	Outcome
Heart attack/ myocardial infarction	Simvastatin	Standard care	Mortality

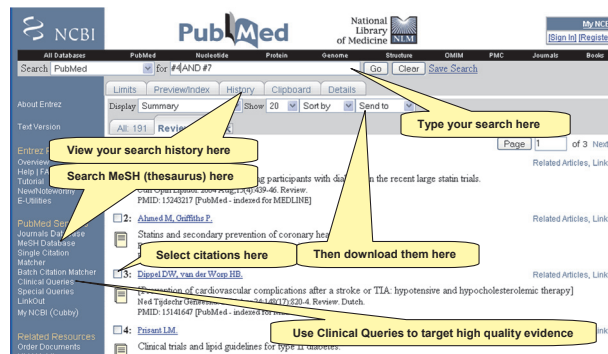
Textword search	Thesaurus search
#1 myocardial AND infarct*	#2 'Myocardial infarction'[MeSH]
#3 heart AND attack*	
#4 #1 OR #2 OR #3: yields 136,950 documents about myocardial infarction	
#5 simvastatin*	#6 'Simvastatin'[MeSH]
#7 #5 OR #6: yields 3,206 documents about simvastatin	
#8 #4 AND #7: yields 191 documents about myocardial infarction and simvastatin	

You will have noticed as you went along that the textword and thesaurus searches for each term yielded different sets of results. This underlines the importance of using both methods. It is best to start your search by casting your net wide with both textword and thesaurus searching and progressively narrowing it to by adding more specific terms or limits.

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Specific notes on PubMed

Unfortunately, different database vendors implement these features differently. In PubMed, typing a single term into the search box automatically carries out both a textword and thesaurus search. You can check how exactly it has searched using 'Details' tab.



To increase **sensitivity**:

- 1 Expand your search using (broader terms in) the *thesaurus*.
- 2 Use a *textword* search of the database.
- 3 Use *truncation* and *wildcards* to catch spelling variants.
- 4 Use *Boolean OR* to make sure you have included all alternatives for the terms you are after (for example (myocardial AND infarction) OR (heart AND attack)).

To increase **specificity**:

- 1 Use a *thesaurus* to identify more specific headings.
 - 2 Use more specific terms in *textword* search.
 - 3 Use *Boolean AND* to represent other aspects of the question.
 - 4 *Limit* the search by publication type, year of publication, etc.
- Depending on which databases you use, these features might have different keystrokes or commands associated with them; however, we have tried to summarize them as best we can in the table below.

Feature key explanation

Expand thesaurus	Use <i>explosion</i> and <i>include all sub-headings</i> to (MeSH) expand your search.
Truncation *(or \$)	analy*, analysis, analytic, analytical, analyse, etc.
Wildcards?	gyn?ecology, gynaecology, gynecology; randomi?*, randomization, randomization, randomized.
Boolean AND	Article must include both terms.
OR	Article can include either term.
NOT	Excludes articles containing the term (for example econom* NOT economy picks up economic and economical but not economy).
Proximity NEAR	Terms must occur close to each other (for example within 6 words) (heart NEAR failure).
Limit (variable)	As appropriate, restrict by publication type (clinicaltrial. pt), year, language, possibly by study characteristics, or by searching for terms in specific parts of the document (for example diabet* in ti will search for articles which have diabetes or diabetic in the title).
Related articles	Once you've found a useful article, this feature (for example in PubMed by clicking the 'Related' hyperlink) searches for similar items in the database.

4 Targeting high-quality evidence

If you want to target high-quality evidence, it is possible to use search strategies that will only pick up the best evidence; see the SIGN website for examples for the main bibliographic databases (<http://www.sign.ac.uk/methodology/filters.html>).

Some MEDLINE services provide such search 'filters' online, so that you can click them or upload them automatically. The PubMed Clinical Queries feature allows you to target good quality diagnosis, prognosis, aetiology and therapy articles as well as systematic reviews.

Searching the internet

You might like to begin searching the internet using a specialized search engine which focuses on evidence-based sources. Two such services are TRIP (see above) and SUMSearch (<http://sumsearch.uthscsa.edu/searchform45.htm>) which search other websites for you, optimizing your search by question type and number of hits.

AskMedline is a new service which allows you to search Medline using the PICO structure: <http://askmedline.nlm.nih.gov/ask/pico.php>

Search MEDLINE/PubMed via PICO

Patient/Problem:

Age Group:

Gender:

Medical condition:

Intervention:

Compare to (leave blank if none):

Outcome (optional):

Select Publication type:

Ask Medline interface

Search engines

Generic internet search engines such as Google are very effective search tools, providing you with a relevance-ranked list of hits.

Some hints to help you get the most out of search engines:

- Use multiple terms to increase the specificity of your search;
- Google automatically truncates search terms and ignores common words such as 'where' and 'how'
- Use quotes to indicate phrases (e.g. 'myocardial infarction');
- Use the minus sign to show terms you don't want to find (e.g. hospital -drama if you want to find hospitals but not hospital dramas)
- Use the advanced search if you want better results;
- Be prepared to look at more than the first page of results.

However, you should be wary of relying on internet search engines because:

- relevance ranking is based on characteristics of the web page, not on an assessment of what it's about (as is the case with MeSH);
- it is not comprehensive;
- you cannot compile complex searches as in bibliographic databases;
- many large web sites contain 'deep content' which is not indexed by search engines.

Can this web site help you to answer your question?

There are many large web sites which provide detailed information about health care topics; sometimes you may be asked to recommend a site for a patient to read up on their condition. But how can you tell when a site is any good?

- 1** Is the site accessible to disabled users?
- 2** Is the design clear and transparent?
- 3** Can you use it effectively?
- 4** Are the objectives of the site and its provider clearly stated?
- 5** Are there any conflicts of interest?
- 6** Is it up to date?
- 7** Does the site report a content production method which includes systematic searching, appraisal and evaluation of information (Badenoch 2004)?

Further reading

- Ask Medline: <http://askmedline.nlm.nih.gov/ask/pico.php>
CASP. Evidence-Based Health Care (CD-ROM and Workbook). Oxford: Update Software, 2005.
SIGN Search Filters: <http://www.sign.ac.uk/methodology/filters.html>
McKibbin A. *PDQ Evidence-Based Principles and Practice*. Hamilton, ON: BC Decker, 2000.
PubMed: <http://www.pubmed.gov>
The SCHARR guide to EBP on the internet: <http://www.shef.ac.uk/scharr/ir/netting/>.
SUMSearch: <http://sumsearch.uthscsa.edu/>
TRIPDatabase: <http://www.tripdatabase.com>
Badenoch DS, Holland J, Hunt D, Massart R, Tomlin A. The LIDA Tool: Minervation validation instrument for health care web sites. Oxford: Minervation Ltd, 2004.
Grimshaw J, Russell I. Effect of clinical guidelines on medical practice: a systematic review of rigorous evaluations. *Lancet* 1993;**242**:1317–22.
Cluzeau FA, Littlejohns P, Grimshaw JM, Feder G, Moran SE. Development and application of a generic methodology to assess the quality of clinical guidelines. *Int J Qual Health Care* 1999;**11**:21–8.
Healy G. Systematic reviews in cancer: results of a comprehensive search. Oxford: Minervation/NLH Cancer Specialist Library, 2005.