

**“Asking Clinical Questions: The First Step in EBM”  
RACP Congress, Adelaide 12 May, 2008**

**Asking Clinical Questions:**

‘*Background*’ questions seek broad topic-based information, the answers to which are most readily found in frequently updated electronic texts.

‘*Foreground*’ questions are the more focused, patient-specific questions that arise in clinical practice. They often relate to questions of diagnosis, treatment, prognosis, risk or cause. ‘*Foreground*’ questions are structured with at least 3 components, and in ‘**PICOT**’ (**P**atient [or **P**opulation] **I**ntervention **C**omparison **O**utcome **T**ime) format, so that each component can become a search term. Here is an example: In patients having major abdominal surgery (p), does physiotherapy (I) prevent post-operative pneumonia (O)?

For more details see Richardson WS et al. ACP J Club 1995; 123(3):A12-13.

**Finding the Evidence:**

The last 10 years or so has seen the development of several resources that provide efficient access to higher levels of evidence. Haynes (ACP Journal Club 2006; 145:A8) proposed the ‘5S’ pyramid of evidence resources to guide you in searching, ie where do you search for evidence first? He states that “Big rewards can be gained from becoming familiar with these new resources”.

Depending on the purpose of your search and the availability of particular databases, you might find searching to be more specific and efficient if you begin searching the highest level resource, then work your way down the pyramid. Searching in this way can be both more efficient and more specific than the traditional approach of just launching into *Medline or PubMed!*

The hierarchy ▲ is as follows:

- |                    |   |
|--------------------|---|
| <b>▲ Systems</b>   | Computerised decision support<br>eg, electronic patient records linked to matching evidence   |
| <b>▲ Summaries</b> | Evidence based textbooks, ie, integrate best evidence from lower levels of systematic reviews etc<br>eg, <i>Clinical Evidence</i> , <i>Clinical Knowledge Summaries</i>                                     |
| <b>▲ Synopses</b>  | Abstracts of reviews and publications, such as those found in evidence based medicine journals<br>eg, <i>DARE Reviews</i> , <i>ACP Journal Club</i> , <i>Evidence Based Medicine</i> , <i>Bandolier etc</i> |
| <b>▲ Syntheses</b> | Systematic Reviews<br>eg, <i>Cochrane Reviews</i> and other reviews published in <i>The Cochrane Library</i> and elsewhere.   |
| <b>▲ Studies</b>   | Original research publications  |

eg, Bibliographic databases such as *Medline* and *EMBASE* including, *selective searches using filters such as 'PubMed Clinical Queries'*.

Often different resources index several or all of the above types of evidence. The Table below identifies useful and widely available resources that will preferentially take you to sources likely to identify the higher levels of evidence. They are typically quick to search.

<p><b>Clinical Evidence</b></p> <p><i>Note: Subscription basis only, but provided by many institutions including hospitals and State health departments</i></p>	<ul style="list-style-type: none"> <li>• Provides access to <b>summaries</b></li> <li>• Best first resource for questions about interventions for common conditions.</li> <li>• Also good for background details such as incidence, definitions</li> </ul>
<p><b>PubMed Clinical Queries – Systematic Reviews option</b></p> <p><a href="http://www.ncbi.nlm.nih.gov/entrez/query/static/clinical.shtml">http://www.ncbi.nlm.nih.gov/entrez/query/static/clinical.shtml</a></p>	<ul style="list-style-type: none"> <li>• Provides access to <b>syntheses</b></li> <li>• Quickest single entry point into PubMed</li> <li>• Does not equate to OVID Medline Clinical Queries – Systematic Reviews</li> <li>• Use limits very carefully (eg, limiting to humans will EXCLUDE more recent reviews)</li> </ul>
<p><b>Cochrane Library</b></p> <p><a href="http://www.nicsl.com.au/Cochrane/">http://www.nicsl.com.au/Cochrane/</a></p>	<ul style="list-style-type: none"> <li>• Searches multiple databases concurrently</li> <li>• Choose Cochrane Reviews for <b>syntheses</b></li> <li>• Choose Other Reviews for <b>synopses</b> (effectively also an index for non-Cochrane reviews)</li> <li>• Choose 'Clinical Trials' for <b>studies</b></li> </ul>
<p><b>National Guidelines Clearinghouse (US)</b></p> <p><a href="http://www.guideline.gov/">http://www.guideline.gov/</a></p>	<ul style="list-style-type: none"> <li>• US repository for evidence based guidelines, which equate to <b>syntheses</b></li> </ul>
<p><b>UK National Health Service (NHS)</b></p> <p><b>Map of Medicine Healthguides</b></p> <p><a href="http://healthguides.mapofmedicine.com/">http://healthguides.mapofmedicine.com/</a> and</p> <p><b>National Library of Health (UK)</b> includes National Library of Guidelines (UK)</p> <p><a href="http://www.library.nhs.uk/guidelinesFinder/">http://www.library.nhs.uk/guidelinesFinder/</a></p> <p>Specialist Libraries</p>	<ul style="list-style-type: none"> <li>• web-based visual representation of evidence-based patient care journeys covering 28 medical specialties and 390 pathways. (<b>Summaries</b>)</li> <li>• UK repository for evidence based guidelines, which equate to <b>syntheses</b>.</li> <li>• Specialist libraries and Clinical Knowledge Summaries (CKS), ie, links</li> </ul>

eg, Paediatrics eg, <a href="http://www.library.nhs.uk/childHealth/">http://www.library.nhs.uk/childHealth/</a> eg Cardiology <a href="http://www.library.nhs.uk/cardiovascular/">http://www.library.nhs.uk/cardiovascular/</a>	to <b>systems</b> and <b>summaries</b> . <ul style="list-style-type: none"> <li>• Q &amp; A Service particularly noteworthy – may address your particular question.</li> </ul>
<b>eMJA Clinical Guidelines (Australian)</b> <a href="http://www.mja.com.au/public/guidelines/guides.html">http://www.mja.com.au/public/guidelines/guides.html</a>	<ul style="list-style-type: none"> <li>• Note: While Australian, this collection is a mixture of evidence based and consensus guidelines</li> </ul>
<b>NHMRC Clinical Guidelines (Australian)</b> <a href="http://nhmrc.gov.au/publications/subjects/clinical.htm">http://nhmrc.gov.au/publications/subjects/clinical.htm</a>	<ul style="list-style-type: none"> <li>• Few listed, but Australian (<b>syntheses</b>)</li> </ul>
<b>TRIP</b> <a href="http://www.tripdatabase.com/index.html">http://www.tripdatabase.com/index.html</a>	<ul style="list-style-type: none"> <li>• Web search engine, ie, it searches approx 60 selected evidence based sites.</li> <li>• Search for <b>summaries, synopses, syntheses</b> and <b>studies</b>.</li> <li>• Good for background searching; more sensitive approach</li> </ul>
<b>PubMed Clinical Queries – Clinical Studies Category</b> <a href="http://www.ncbi.nlm.nih.gov/entrez/query/static/clinical.shtml">http://www.ncbi.nlm.nih.gov/entrez/query/static/clinical.shtml</a>	<ul style="list-style-type: none"> <li>• Looks for particular <b>studies</b>, designs that best match the question</li> <li>• A good choice before launching into a general PubMed search</li> </ul>
<b>BMJ Updates<sup>+</sup></b> <a href="http://bmjupdates.mcmaster.ca/index.asp">http://bmjupdates.mcmaster.ca/index.asp</a>	<ul style="list-style-type: none"> <li>• Indexes research publications deemed to be of interest to professional peers</li> </ul>

**UpToDate** is not generally regarded as an evidence-based resource, although it has made a concerted effort to improve its evidence-base in the last few years. Best likened to a well-referenced electronic textbook, it has a wide subject coverage and is regularly updated. At the least, it provides an immediate expert opinion, and potentially sound evidence. But be mindful of its potential variability. Requires a paid subscription, but it is provided by some institutions.

### Other Approaches

If these do not provide answers to your questions, then it is likely you will need to follow the more traditional approach of constructing a detailed search on a bibliographic database, and possibly use supplementary tools such as Web search engines.

### Bibliographic Databases

There are literally 1000s of such databases, but the key ones of relevance to the general biomedical sciences are **Medline** or **PubMed**, and **EMBASE**.

## A Few Common Questions

### *What is the difference between Medline and PubMed?*

Often people use the terms Medline and PubMed interchangeably. However they are not equivalent. The US National Library of Medicine provides free access to the PubMed system. PubMed comprises many different datasets, including Medline and PubMed Central.

Medline = records formally indexed with MeSH (Medical Subject Headings) terms. These citations are sold to vendors such as OVID who make the records available using their own interface, resulting in OVID Medline.

PubMed Central = records not indexed for Medline. These include a wide range of Open Access journals that will never be indexed for Medline. It also includes some of the more recent material, eg, ePublications or In-Process records which ultimately will be indexed with MeSH, but it may take up to two years for this to happen.

When you search PubMed, it automatically runs the search in both Medline and PubMed Central. Hence at any point in time, searching PubMed will potentially retrieve more records (and more recent records) than searching any commercial Medline product.

To find out more about PubMed searching, try their online tutorials. They are brief and target specific topics. Select the link to tutorials on the left hand side menu on PubMed's homepage: <http://www.ncbi.nlm.nih.gov/sites/entrez>

### *What is a MeSH term?*

MeSH stands for Medical Subject Heading. MeSH terms represent the formal indexing language used by Medline. Approximately 6000 journals are indexed for Medline. Indexers provide each journal article with anywhere up to approximately 15 MeSH terms that best reflect its subject content. Indexers follow rules to ensure consistency. For example, imagine two articles: one discusses complementary medicine, and the other alternative therapy. Both would be indexed with the MeSH term complementary therapies, as that is the preferred term. Hence the most efficient way to search for the subject on Medline is to use the term 'complementary therapies'.

PubMed automatically 'maps' your search terms to MeSH terms. Sometimes it does this well, and sometimes it doesn't. You should check what it does in the 'Details' field. Importantly, because PubMed Central records are not indexed with MeSH terms, you should also consider the best textwords (ie, natural language rather than MeSH terms) to find these relevant records too.

### *What is Boolean logic?*

The use of the words AND, OR and NOT to combine terms or searches. A simple memory aid is to remember that 'OR' means MORE (ie, a more sensitive search), and 'AND' means LESS (ie, a more specific search). In PubMed, ALWAYS use these words in upper case.

### *What is truncation?*

Truncation is the use of symbol (Usually an asterisk \*) at the end of the last common letter shared by different word variations of interest. For example, palliat\* will retrieve palliate, palliates, palliation, palliative etc. Effectively it creates a large search string that combines all of the possible terms with the Boolean operator OR (ie, a more sensitive search)

It needs to be used with 'mindfulness'. For example, child\* will retrieve child, children etc, but will also retrieve childrearing, childbearing etc which may or may not be of interest. In PubMed, the use of truncation will also turn off the automatic MeSH mapping function.

### *What is EMBASE?*

EMBASE is probably the single most relevant bibliographic database other than Medline and PubMed in the biomedical sciences, with an emphasis on pharmacology. It is offered by some institutions (usually using the OVID interface), but not commonly. This is because of its high cost. However it indexes a range of unique material simply unindexed elsewhere. Its common coverage with Medline varies from between 30% to 70% depending on your topic. It is worth checking to see if you have access to this database.

## **Web Search Engines**

While searching the TRIP database to answer clinical questions is the better first step (it selectively searches evidence based medicine sites), it may be necessary to look more broadly. It is extremely difficult to search the Web efficiently, yet it is possible to improve the effectiveness of how you search to some degree. Google Scholar <http://scholar.google.com.au/> and SCIRUS <http://www.scirus.com/> are perhaps most commonly used by health care professionals, although there are many others. The following weblinks may assist you:

The National Library of Australia also provides a list of different engines:

[http://www.nla.gov.au/pathways/pthw\\_global.html](http://www.nla.gov.au/pathways/pthw_global.html)

Intute provides useful information on web searching in medicine:

<http://www.intute.ac.uk/healthandlifesciences/medicine/>

Internet tutorial on selecting web search engines at:

<http://www.internettutorials.net/choose.html#options>

University of South Carolina: Bare Bones 101: A Basic Tutorial on Searching the Web <http://www.sc.edu/beaufort/library/pages/bones/bones.shtml>