

November 5, 2003

## Introduction

### Caveats

<b>Not Experiential</b>	When William Sieber was looking for content for our Research Fellowship meetings, I volunteered – having useful information in doing “clinical searches.” However, I do not have uniform or consistent experience in research. So I’ve had to hunt out and make up strategies, tips and sources that might be helpful to a researcher.
<b>A Patchwork</b>	To do this, I have spent time online reviewing various tips and resources, went through the PubMed Tutorial, discussed ideas with others... What I’ve patched together isn’t even a quilt – it’s just a patchwork. But hopefully there are some helpful tips here.
<b>Varying Goals</b>	My purposes are a bit varied here because of my own personal mission: <ul style="list-style-type: none"> <li>▪ Clinical help – My own work is dedicated to help clinical effectiveness and decision-making, so I sneak in some information to help you answer clinical questions.</li> <li>▪ Systematic review tips – I also include information about systematic reviews because there is possibly as much or more work needed in this arena than in “generating new knowledge.” You may wish to take on an SR as one of your fellowship projects.</li> <li>▪ Research searching – My primary goal is to give you tips to help you conduct primary research. Yet this is necessarily incomplete. You will have to become a “researcher” of additional assistance toward your own searching needs.</li> </ul>

### Recognition and Recommendations

<b>Thanks!</b>	I have much gratitude for Nancy Stimson, UCSD Biomedical Library, because of her incredible helpfulness. Nancy is only responsible for anything good within and nothing bad – ALL failings, inconsistencies, weaknesses, etc., are mine and mine alone. Also, I always am grateful for the help of Ted Ganiats and Mike Stuart – some of Mike’s great work is reflected here in the clinical help pieces. And big thanks to all those who created what I cut & pasted from!
<b>Partnering with the Library for Help</b>	<p>I STRONGLY recommend using the services of the wonderful Biomedical Library. They offer classes and can provide one-on-one consultations for specific research questions. Our colleagues in the library are knowledgeable resources and are wonderfully helpful – they truly demonstrate the best attributes of being there to serve.</p> <p>As an example, there is so much to understand of PubMed when you are working as a researcher in particular. Our Biomedical Library angels can help you incredibly on things like using MeSH terms versus keyword searching, publication types and subsets, and more that cannot be covered here. When working with them, think of yourself as partnering with them to create a synergy between what they know and what you most need. Here’s how you can reach them:</p> <p>UCSD Databases for BML/MCL (Biomedical Library/Medical Center Library)  <a href="http://scilib.uscd.edu/bml/">http://scilib.uscd.edu/bml/</a></p> <p>Online clinical library  <a href="http://gort.ucsd.edu/clinlib/">http://gort.ucsd.edu/clinlib/</a></p>

### A Few Key Tips Overall

<b>Documentation</b>	Save your strategies. Document everything.
<b>Currency of Data</b>	Look for gaps in time: database, article, references.
<b>Virtues of Having OCD</b>	It will be harder than you expect – so expect that. Meticulousness to the point of psychosis (or at least borderline) is required.
<b>Luck</b>	And even from an evidence-based girl, luck is part of the formulation. Good luck and godspeed!

<b>Contents...</b>	<b>Page</b>
What is the purpose of your search? Directional tips	3
Figure 1. BMJ Box “What is known on this topic; what this study adds”	4
Advice from an Evidence-based Medicine Perspective	4
Figure 2. The Hierarchy of Evidence	4
Figure 3. Best research methodology for answering a specific question	5
Basic Types of Information and Tips for Finding	5
Sources for Information – Databases	6
Sources for Information – Research Awareness	7
Alerts on newly published articles	7
Information on Ongoing Clinical Trials	7
Some Cool Features in PubMed	8
Searching Suggestions	9
UCSD BML	9
PubMed	9
Alternative Terms Example	9
MeSH Browser Example	10
Boolean Searching	10
Search Filters	11
Appendix (Modified)	12
Sample – PubMed MeSH Browser: “Decision”	12

What is the purpose of your search? Directional tips...	
Answer a clinical question	<ul style="list-style-type: none"> <li>▪ You need the most reliable sources for quality and usability.</li> <li>▪ You need efficient search, filter and acquire strategies.</li> </ul> <p>➔ For tips see <i>Delfini</i> Guide to Searching the Medical Literature.</p>
Conduct a systematic review	<ul style="list-style-type: none"> <li>▪ You need to understand the requirements for a systematic review and how to find the right studies for combining for results.</li> </ul> <p>➔ Find a resource like JAMA User's Guides or from readings such as recommended readings on <a href="http://www.delfini.org">www.delfini.org</a>, including <i>Delfini</i> Systematic Review Appraisal Tool.</p>
Get an idea for a research topic	<p>You want to find sources for ideas that will provide value in primary care.</p> <ol style="list-style-type: none"> <li>1. Look for gaps in optimal care and current medical practice that are not well studied               <ul style="list-style-type: none"> <li>○ De Maeseneer JM, van Driel ML, Green LA, van Weel C. The need for research in primary care. Lancet PMID: 14575979 [PubMed - in process]. 2003 Oct 18;362(9392):1314-9.</li> </ul> </li> <li>2. Look for hypothesis-generating ideas through sub-group analysis, post-hoc analysis, case series or case reports</li> <li>3. Look for poor quality research which you can do well – DOEs; observational studies on therapy, etc.; inadequately powered studies with n/s findings; flawed studies, etc.</li> <li>4. Use explicit clinical practice guidelines to find gaps</li> <li>5. Get ideas from other people (research leaders, experts including those not in the field in which you are interested) and the literature – samples...               <ol style="list-style-type: none"> <li>a. Discussion sections in reviews</li> <li>b. Berwick article and rebuttal on safety</li> <li>c. BMJ boxes – “What is known on this topic; what this study adds” – See Figure 1.</li> <li>d. Other?</li> </ol> </li> </ol>
Learn what has already been studied on a topic	<p>You need to –</p> <ul style="list-style-type: none"> <li>▪ Do a thorough search to learn what has already been done on a topic. (See Search Filters.)</li> <li>▪ Know, of that work, what is considered to be the key work.</li> <li>▪ Evaluate the quality of what you find (i.e., critically appraise it).</li> </ul>
Justify a research effort	<p>Immediately above plus you need to –</p> <ul style="list-style-type: none"> <li>▪ Provide background for why your question is worth answering within existing need.</li> <li>▪ Position your work within the context of past work.</li> <li>▪ See Figure 1. BMJ boxes – “What is known on this topic; what this study adds” – See Figure 1</li> </ul>
Other?	

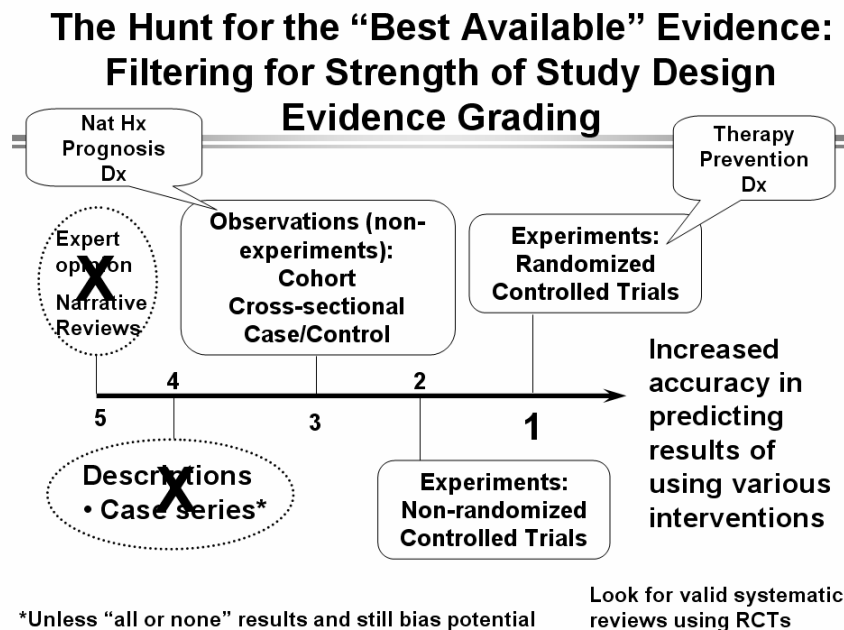
Figure 1. BMJ – “What is known on this topic; what this study adds”

What is already known on this topic
Review articles, especially if they are not systematic in their approach, can present incomplete or incorrect information, with few clues given to unsuspecting readers
Previous research has indicated that the quality of a review article varies inversely with the expertise of the author
What this study adds
The results of the United Kingdom prospective diabetes study have not been transmitted accurately via review articles
Much of the “patient oriented evidence that matters” from the study is missing from these reviews
Clinicians relying on these information sources for accurate clinical information may be misled

**Advice from an Evidence-based Medicine Perspective**

1. Know the basics of evidence based-medicine, especially critical appraisal.
2. Understand which study designs have higher methodologic strength than others (Figure 2.)

Figure 2. The Hierarchy of Evidence



3. Understand which research methodologies are the best for answering a specific type of question (Figure 3.)

Figure 3. Best research methodology for answering a specific question

Question Topic	Needs	Study Type
Treatment, Screening or Prevention – what happens when you do something to someone?	Experiment = Randomize appropriately and compare groups	RCT
Diagnosis – does what it is supposed to do & does it improve care?	Need data to calculate sensitivity/specificity/predictive values – independent, blind comparison with a “gold standard”	RCT/ Cross-sectional
Natural history – what happens when you follow natural course of a condition	Not an experiment – follows what actually happens over time	Cohort
Prognosis – what happens when you follow the natural course of a condition	Not an experiment – follows what actually happens over time	Cohort

4. Have an understanding of sources for information and how to evaluate information once you get it:

Basic Types of Information	Tips for Finding
Secondary sources (systematic reviews including meta-analyses, guidelines, other clinical content) <ul style="list-style-type: none"> <li>You might need to critically appraise these.</li> </ul>	<ul style="list-style-type: none"> <li><i>Delfini</i> Guide to Searching the Medical Literature – information on high quality sources, methods and advice for when you need to do an appraisal</li> <li>www.delfini.org – Favored Links</li> </ul>
Primary sources (articles from original research) <ul style="list-style-type: none"> <li>You do need to critically appraise these.</li> </ul>	<ul style="list-style-type: none"> <li><i>Delfini</i> Guide to Searching the Medical Literature</li> <li>PubMed: Access through UCSD Biomedical Library – <a href="http://scilib.uscd.edu/bml/">http://scilib.uscd.edu/bml/</a></li> <li>Do hand-searches of references in key articles and articles of interest and in bibliographies of texts</li> </ul>
Grey literature (“The quasi-printed reports, unpublished but circulated papers, unpublished proceedings of conferences, printed programs from conferences, and the other non-unique material which seems to constitute the bulk of our modern manuscript collections.” (Hirtle 1991). <ul style="list-style-type: none"> <li>You do need to critically appraise these.</li> </ul>	<ul style="list-style-type: none"> <li>Research and opinion leaders, authors, etc. (also for what is “in press”)</li> <li>Unknown, but may be of possible help: <a href="http://www.greynet.org/pages/1/">http://www.greynet.org/pages/1/</a></li> </ul>
Textbooks, Other? <ul style="list-style-type: none"> <li>Caveats on validity and usability.</li> </ul>	

November 5, 2003

## Sources for Information – Databases




What do the best choose?

<p><b>Clinical Evidence</b>  <b>MedLine</b>  <b>EMBASE*</b>  <b>Cochrane</b></p>	<p><b>Cochrane</b>  <b>MedLine</b>  <b>EMBASE*</b>  <b>Grey literature</b></p>
--	--

## UCSD Databases for BML/MCL (Biomedical Library/Medical Center Library)

This page lists databases covering materials in the biomedical sciences. For more databases covering all subjects, please visit the Databases A-Z page at the UCSD Libraries site.

**About Some Key Databases – Always note the limitations of years for database, but also in any bibliographies.**

- **BIOSIS Previews** : 1969 – to present. Citations for over 6,000 journals, books, conference papers in biology & life sciences
- **CINAHL: Cumulated Index to Nursing and Allied Health Literature** – 1982 - present. Covers journal literature in nursing and allied health disciplines, including physical & occupational therapy, clinical nutrition, speech pathology.
- **Current Contents** - 1993-present. Citations from over 6500 scholarly journals in all disciplines: arts & humanities, social sciences, and sciences.
- \*  **EMBASE** – European and concentrates on drugs – Per BML, very good resource, yet not available at UCSD except going through BML Reference Librarian for a fee (contact Penny Coppennoll-Blach).
- **LILACS** - Latin American and Caribbean Literature on the Health Sciences is a BIREME System's cooperative database which covers literature related to the health sciences and has been published in countries of the Region since 1982. It contains articles from about 670 of the most well-known journals in the medicine field, reaching approximately more than 150,000 records and other documents, such as: theses, chapters of theses, books, chapters of books, congress and conference proceedings, technical and scientific reports and governmental publications.
-  **MedLine** – **MedLine** is the National Library of Medicine (NLM) on-line database of medical, dental, nursing and basic life science publications. **PubMed** is the user-friendly interface for MedLine.
-  **PsycINFO Database (Psychological Abstracts)**: 1840-present. Access to international literature in psychology, cognitive science, and related disciplines. Abstracts journal articles, book chapters, and dissertations. Many articles are available full-text.
- **IN PubMed = TOXNET®** links to the NLM's TOXNET Web site which provides access to a cluster of databases on toxicology, hazardous chemicals, and related areas.
- At UCSD BML – Lots of resources including **MICROMEDEX** for drug info.
- **Other?**

November 5, 2003

---

## Sources for Information – Research Awareness

### Alerts on newly published articles –

**Through UCSD BML – Current Awareness Updates (PDF)** Keep up-to-date on your search topics. PubMed has more up-to-date citations than any other MEDLINE provider, but it does not have an automatic e-mail update service. **PubCrawler** and **BioMail** are free third-party tools which you can set up to send you automatic search results by e-mail based on a PubMed query that you store on their systems.

*Tip:* the *most recent* citations in PubMed have no MeSH subject terms attached, so for the most recent articles, you'll want to base your current awareness search on title/text words, authors, and/or journal name, and not use limits like age group, human/animal, language, or publication type.

No specific recommendation from BML – each is a little different; it's totally a personal preference:

#### For **PubCrawler**

<http://www.pubcrawler.ie/>

Remember: "It goes to the library. You go to the pub."

#### For **BioMail**:

<http://berlios.informatics.sunysb.edu/cgi-bin/biomail/users.pl>

### Information on Ongoing Clinical Trials –

- **IN PubMed = ClinicalTrials.gov** links to the NIH/NLM Web site for current information about clinical research studies.
- **DARE – “Full search:** It is important to find out if there are major studies on the research question in progress in order to contact the researchers for preliminary information, and learn when the study is to be completed and the results made available. The following resources have a UK bias. A wide range of research registers outside the UK could also be identified and consulted.”

<http://www.york.ac.uk/inst/crd/revs1.htm>

November 5, 2003

## Some Cool Features in PubMed

What do you want to do?	Where do you want to go? Features Bar
To learn PubMed	<b>Tutorial</b> — Easy to navigate for specific features described below – and more.
Restricts searches to specific fields	<p><b>Limits</b></p> <ul style="list-style-type: none"> <li>Restrict to age groups, gender, <b>type of study</b>, Entrez or publication date, a specific language, types of articles, or <b>subsets</b>.</li> <li>For tips see <a href="#">Delfini</a> Guide to Searching the Medical Literature</li> </ul>
View your search strategy as it was translated by PubMed	<p><b>Details</b> – reasons to use ➔</p> <p><b>See how PubMed translated your search:</b></p> <ul style="list-style-type: none"> <li><b>Understand your retrieval</b>, deal with surprises, find misspellings</li> <li><b>Edit your search</b></li> <li><b>Save your search strategy:</b> If you want to save the current strategy for later use, click on the <b>URL</b> button. Use your Web browser's bookmark or favorites feature to save this URL. Another way to save your search strategy is to use the <b>Cubby</b>. <b>Tip:</b> Do save the strategy finally used for certain! <b>Note:</b> Searches that are created using a search statement number (in <b>History</b>) for example, #1 or #2, should not be saved using the URL button as the search statements represented by these numbers are lost when History is automatically deleted after one hour of inactivity.</li> </ul>
View and combine previous queries	<p><b>History</b></p> <p><b>Tip:</b> May be most useful for viewing only. May be easier to perform multiple single or simple searches rather than complex ones. It's a personal preference thing. You can get a lot of help from BML on queries.</p>
Collect citations – TEMPORARILY	<p><b>Clipboard</b></p> <ul style="list-style-type: none"> <li>Can collect up to 500 items from current or previous searches. <b>Limited in time stored.</b></li> <li>Can save items, remove them and print.</li> <li>PubMed can also save citations to a file on your computer. You can save individual, selected, or all citations. There is a limit of 10,000 items.</li> </ul>
What do you want to do?	Where do you want to go? Side Bar
Use some selected pre-constructed search methods	<p><b>Clinical Queries</b></p> <ul style="list-style-type: none"> <li>Specialized searches for clinicians – “Clinical Queries using Research Methodology Filters based on Haynes RB et al. Developing optimal search strategies for detecting clinically sound studies in MEDLINE. <i>J Am Med Inform Assoc.</i> 1994 Nov-Dec;1(6):447-58.”</li> <li>Specialized query for retrieving systematic reviews.</li> <li>For tips see <a href="#">Delfini</a> Guide to Searching the Medical Literature</li> </ul>
Benefit from a more permanent and sophisticated way than <b>Clipboard</b> to store search strategies = <b>Cubby</b>	<p><b>Cubby</b> – requires registration and cookies</p> <p><b>Store a Search and Check What's New</b></p> <p>Store searches that you run regularly to check for new items retrieved.</p> <ul style="list-style-type: none"> <li><b>Reviewing Information About a Stored Search</b></li> </ul> <p>You can click on the Cubby search name to see details about your Cubby stored search. Information about the stored search includes the Cubby Search Name, the date and time the search was stored or last updated, and the search strategy and limits used.</p>
See what else is related in PubMed	<p><b>Related Articles &amp; Links</b></p> <p><b>Tip:</b> Can use <b>Links</b> to see MeSH terms used for searching ideas.</p>
Browse medical subject headings	<p><b>MeSH Browser</b> To browse for a term, enter the term in the search box and click Go. If there is no match or associated term, the browser provides a list of possible terms for you to choose from.</p>
Search for a journal	<p><b>Journals Database</b></p> <p>The Journals Database is accessed from the PubMed sidebar. It allows you to look up a journal and search for citations from that journal in PubMed. You can locate the journal using:</p> <ul style="list-style-type: none"> <li>The title of the journal.</li> <li>The ISSN (International Standard Serial Number).</li> <li>The MEDLINE journal title abbreviation.</li> <li>The NLM ID (NLM's unique journal identifier).</li> </ul>



November 5, 2003

## Searching Suggestions

- Courses available on "Searching" through UCSD Biomedical Library
- Access PubMed through UCSD BML to get full text where available to UCSD

Go through –  
<http://scilib.ucsd.edu/bml/>

1. Choose **PubMed Information for UCSD**
2. Then **PubMed Profiled for UCSD Users**

**Quick Tip from UCSD BML:** "PubMed's links to our journals are not complete - we have a number of journals online that PubMed does not link to. Some users find it easier to open a second window with either ROGER or our E-Journals page. This makes it easy to flip back and forth to check on all of our holdings. ROGER accepts official MEDLINE abbreviations for journal titles, so you can just copy and paste the journal names from PubMed into the Title search in ROGER. These links will open either our E-Journals pages or a ROGER Journal Title search in a second window."

## Search Strategy Tips From PubMed

- Identify the key concepts.
- Determine **alternative terms** for these concepts, if needed.
- Refine your search to dates, study groups, etc., as appropriate.
- Practice helps. Strategies and styles will differ according to personal choice and professional discipline

**Alternative Terms Examples – "Do physician communications improve patient outcomes?" = 5 hits in PubMed**

1. Physician communications patient outcomes = 28
2. Physician **communication** patient outcomes = 503
3. Communication OR bedside manner OR rapport OR relationship OR medical interview = 878070
4. Communication OR bedside manner OR rapport OR relationship OR medical interview **AND** patient outcome = 9452
  - #4. Using "Clinical Queries," Systematic Reviews = 644
    - That is how we got to this → . Beck RS, Daughtridge R, Sloane PD. Physician-Patient Communication in the Primary Care Office: A Systematic Review. JABFP 2002. 15:25-38. JABFP
  - #4. Using Limits - meta-analysis = 61

## MeSH Browser

- Online vocabulary look-up aid available for use with MeSH® (Medical Subject Headings).
- Designed to help quickly locate descriptors of possible interest and to show the hierarchy in which descriptors of interest appear.
- The MeSH hierarchy can also be displayed online as in this example and each descriptor is a direct link to the complete MeSH record for that term. Example for Breast Neoplasms:

Neoplasms [C04]

Neoplasms by Site [C04.588]

Abdominal Neoplasms [C04.588.033] ±

Anal Gland Neoplasms [C04.588.083]

Bone Neoplasms [C04.588.149] ±

▶ Breast Neoplasms [C04.588.180]

Breast Neoplasms, Male [C04.588.180.260]

Mammary Neoplasms [C04.588.180.520]

Mammary Neoplasms, Experimental [C04.588.180.525]

Phyllodes Tumor [C04.588.180.762]

Digestive System Neoplasms [C04.588.274] ± etc...

November 5, 2003

---

## Boolean Searching

**TIP:** May be best to keep it simple and do multiple searches rather than one huge comprehensive search.

- Boolean searching lets you put search terms into logical groups through the use of connecting terms (Boolean connectors): **AND, OR, NOT**. For example, *apples or oranges* broadens a search (**either** term may be in the records retrieved). Whereas, *apples and oranges* narrows the search (**both** terms must be in the records retrieved). **Not** excludes terms: *oranges not apples* excludes records which contain the word apples.
- Boolean operators -- AND, OR, NOT -- must be entered in uppercase letters.
- Boolean operators are processed from left to right.
- Use parentheses to nest terms together so they will be processed as a unit and then incorporated into the overall strategy.

**Truncation** = \* as wild card. Truncation turns off automatic term mapping and the automatic explosion of MeSH terms. For example, **heart attack\*** will not map to the MeSH term *Myocardial Infarction* or include any of the more specific indentions, such as *Myocardial Stunning*

**Nesting** involves using parentheses to insure that Boolean operations are performed in the sequence you intend. This technique allows you to build a complex search using two or more operators (AND, OR, NOT).

**CAUTION!** You may not build a good search using more than one Boolean operator without using nesting.

**Example of simple nesting & what is going on in the search:**

**Find: smoking AND (adolescents OR teenagers) = 15978**

In this search the OR operation is nested and will be performed first. Then the AND operation will be performed. This search will retrieve items on smoking and adolescents as well as items on smoking and teenagers.

**Using Details reveals the actual search used → ("smoking"[MeSH Terms] OR smoking[Text Word]) AND ("adolescent"[MeSH Terms] OR adolescents[Text Word]) OR ("adolescent"[MeSH Terms] OR teenagers[Text Word])**

**Example of more complex nesting:**

**Find: (smoking OR tobacco OR nicotine) AND (adolescents OR teenagers) = 17468**

The OR operations inside both sets of parentheses will be performed first, and then the resulting sets will be combined using the AND operator. Nesting synonyms in this way can broaden your search.

**((("smoking"[MeSH Terms] OR smoking[Text Word]) OR ("tobacco"[MeSH Terms] OR tobacco[Text Word])) OR ("nicotine"[MeSH Terms] OR nicotine[Text Word])) AND ("adolescent"[MeSH Terms] OR adolescents[Text Word]) OR ("adolescent"[MeSH Terms] OR teenagers[Text Word]))**

**BAD Example:**

- **Find: smoking OR tobacco AND adolescents OR teenagers = 991374**

This search will perform the OR and AND operations in the sequence that they are typed. This will retrieve items that are irrelevant! You will retrieve all items about "teenagers," not just those relating to smoking.

**((("smoking"[MeSH Terms] OR smoking[Text Word]) OR ("tobacco"[MeSH Terms] OR tobacco[Text Word])) AND ("adolescent"[MeSH Terms] OR adolescents[Text Word])) OR ("adolescent"[MeSH Terms] OR teenagers[Text Word]))**

November 5, 2003

---

**Search Filters – Not necessarily recommended by BML, but included here to point out complexities. Syntax varies for different sources of information.**

## **Scottish Intercollegiate Guidelines Network**

<http://www.show.scot.nhs.uk/sign/methodology/filters.html>

Search filters are pre-tested strategies that identify the higher quality evidence from the vast amounts of literature indexed in the major medical databases. Filters exist for most types of experimental design, and are comprised of index terms relating to study type and specific terms associated with the methodological description of good experimental design.

These are designed for specificity.

- Systematic Reviews
- Randomised Controlled Trials
- Observational Studies
- Diagnostic Studies
- Economic Studies

## **DARE**

<http://www.york.ac.uk/inst/crd/search.htm>

Search Strategies to Identify Reviews and Meta-analyses in MEDLINE and CINAHL

Options for sensitivity and specificity

Sample – PubMed MESH Browser: “Decision”

**National Library of Medicine - Medical Subject Headings**

**2003 MeSH**

[Return to Entry Page](#)

**Please select a term from list:**

Decision Making

Decision Making, Computer-Assisted

Computer-Assisted Decision Making

Medical Decision Making, Computer-Assisted

Decision Making, Organizational

Organizational Decision Making

Decision Support Systems, Clinical

Clinical Decision Support Systems

Decision Support Systems, Management

Decision Support Techniques

Decision Analysis

Decision Modeling

Models, Decision Support

Analysis, Decision

Decision Aids

Decision Support Technics

Decision Theory

Decision Trees

Epilepsy, Reflex

Decision Making Reflex Epilepsy

Jurisprudence

Court Decision

Resuscitation Orders

Resuscitation Decisions

Supreme Court Decisions

United States Supreme Court Decisions

legislation & jurisprudence

court decisions