Efficient Literature Searching

HSA 7759: Quality and Outcomes in Health Services Research

1/23/2014

Nancy Schaefer
Health Science Center Libraries
352-273-8417
I. Databases, Library Catalog, Grey Literature

II. Accessing HSC Library resources

III. Constructing a Search
   A. Boolean operators
   B. Truncation and phrase searching
   C. Controlled vocabularies
   D. Field searching
   E. Limits and filters
Bibliographic Databases

• Show what’s been published
• Different databases focus on different topics and index different sources
  – Most cover journals
    • Most do NOT cover all items (letters, editorials, errata, ads) or even all articles within the journals they index
  – Some include books and book chapters
  – A few include or specialize in dissertations & theses, meeting abstracts or proceedings
• No guarantee you can link to or directly access the full-text of anything in them
Library Catalog

• Indicates what you have access to: what your library holds in print or licenses in electronic format

• Database don’t always “play nice” with catalogs. If you can’t link through a database, open another browser session and try the JOURNAL (not article) title in the UF Library catalog
Includes:
- Reports
- white papers
- PPT presentations
- data
- blog posts

In short, documents or formats NOT published in “regular” serial or monographic formats or indexed in “normal” bibliographic databases.

UF access not needed

Examples:
- New York Academy of Medicine Grey Literature Report (quarterly)  http://www.greylit.org/home
- Inter-university Consortium for Political and Social Research (ICPSR)  http://www.icpsr.umich.edu/icpsrweb/ICPSR/index.jsp
To start: authenticate your right to ACCESS:
• On-campus computer with UF IP address
• Download VPN (virtual private network)
• Login to proxy server

http://library.health.ufl.edu/
Navigating to Databases
Databases

http://library.health.ufl.edu/find/databases/

<table>
<thead>
<tr>
<th>Database</th>
<th>AccessMedicine</th>
<th>BIOSIS</th>
<th>CAB</th>
<th>CINAHL</th>
<th>Clinical Pharmacology</th>
<th>Impact Factor JCR</th>
<th>IPA</th>
<th>PubMed</th>
<th>Web of Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cochrane Library</td>
<td></td>
<td>EBSCOhost Web</td>
<td>HaPI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MD Consult</td>
<td></td>
<td>NCBI</td>
<td>ProQuest</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SportDiscus</td>
<td></td>
<td>STAT!Ref e-books</td>
<td>TOXLINE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All HSCL databases</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All library databases (A-Z list)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

More details on the quick picks:

AccessMedicine - the search engine which helps you find matches based on the true meaning of the concepts detailed in the content.
<table>
<thead>
<tr>
<th>Database</th>
<th>Topics Covered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access Medicine</td>
<td>E-textbooks, all medical specialties</td>
</tr>
<tr>
<td>ACP PIER</td>
<td>In STAT-REF! A collection of 400+ evidence summaries published by the American College of Physicians. Search or browse by organ system. Has integrated drug reference</td>
</tr>
<tr>
<td>Clinical Pharmacology</td>
<td>Database for practicing pharmacists/healthcare providers on drugs, investigational drugs, herbal products, nutraceuticals, nutritional products</td>
</tr>
<tr>
<td>CINAHL</td>
<td>Nursing and allied health, including <strong>health services/administration</strong>, rehabilitation</td>
</tr>
<tr>
<td>Cochrane Library</td>
<td>Evidence based Medicine. includes Cochrane Database of Systematic Reviews, Cochrane Central Register of Controlled Trials, and Database of Abstracts of Reviews of Effectiveness (DARE)</td>
</tr>
<tr>
<td>IPA- International Pharmaceutical Abstracts</td>
<td>Research lit on drug therapy, toxicity, and pharmacy practice, legislation, regulation, technology, utilization, biopharmaceutics, information processing, education, economics, and ethics</td>
</tr>
<tr>
<td>PsycINFO</td>
<td>Psychology, psychiatry, mental health, psychosocial aspects of health and illness</td>
</tr>
<tr>
<td>PubMed</td>
<td>Bench science, clinical medicine, <strong>health services/admin</strong>, health care delivery and practice, rehabilitation,, nutrition, pathology, psychiatry. Clinical queries and systematic review filters limit to evidence-based literature</td>
</tr>
<tr>
<td>Up to Date</td>
<td>Evidence-based, peer reviewed clinical information. On campus and VPN access only</td>
</tr>
</tbody>
</table>
## Other Potentially Useful Databases

<table>
<thead>
<tr>
<th>Database</th>
<th>Relevant Topics Covered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hein Online</td>
<td>Legal info . Access thru “All library databases A-Z” <a href="http://guides.uflib.ufl.edu/azlist">http://guides.uflib.ufl.edu/azlist</a> or Business LibGuide – Databases link at top of this table)</td>
</tr>
<tr>
<td>ProQuest</td>
<td>ABI/INFORM (business), Applied Social Sciences Index and Abstracts (ASSIA), Biological Sciences (includes Health &amp; Safety Science Abstracts), ERIC (Education Resources Information Center), ProQuest Dissertations &amp; Theses (most full-text), PAIS (international public affairs/admin), PILOTS (PTSD exclusive), Sociological Abstracts. Keyword searching, esp. simultaneously across multiple databases = possible but a nightmare. Search databases with Thesaurus in Advanced Search individually.</td>
</tr>
<tr>
<td>Web of Science</td>
<td>Sciences, Social Sciences, and Humanities editions. Includes “times cited” and “cited by” information. No controlled vocabulary, tho you can “refine” (limit) by discipline.</td>
</tr>
</tbody>
</table>
Search Basics

Different databases accomplish the same functions in slightly different ways

Our focus will be on PubMed, but these techniques apply to ANY literature database and many even to searches on Google Scholar or Bing:

– Boolean operators
– Nesting
– Keyword vs. “controlled vocabulary”
– Field searching
– Limits
– Combining in Search History
Boolean Operators

Used in database searching to identify 3 relationships among search terms/results:

AND = intersection
OR = alternatives
NOT = exclusion
**AND**

*BOTH* terms must appear in every citation retrieved.

If a citation contains only one of the two terms, it will not be retrieved.

If the citation has neither term, it will not be retrieved.
Only one (NOT both) of the terms is needed for the citation to be retrieved

OR will retrieve the citation if either term is included…

and also retrieve a citation that includes both terms
The database searches for all citations containing the first term.

It then scoops out any citations that also contain the second term.

Therefore, citations that contain both will *not* be retrieved.
Terms for the same concept (synonyms or “related terms”) are usually combined with OR.

If you have only one search box, type your Boolean term in ALL CAPS to make sure the database doesn’t try to search for the Boolean.

faculty OR teachers OR professors
Multiple Search Boxes

Most databases’ Advanced Search pages include multiple search boxes with Booleans in pull-downs.

The default is usually AND, so you may need to change the pull-down to OR (or NOT, if it’s applicable and available)
Combining Results from Searches with Multiple Search Boxes

*Never* use different Boolean pull-downs in the same search.

Instead, do your OR searches separately, THEN combine their results (probably in Search History.)
- You *can* safely include OR and AND in the same search if you put your different groups of synonyms in different search boxes.
Nesting

If you use

• more than one type of Boolean operator (AND, OR, NOT)
• in a single search box or statement,

house each group of synonyms in its own nest of parentheses ( )
Using NOT

- “NOT” segments often end a search statement
- Used most often to eliminate unwanted terms or subgroup(s) of citations
- Can contain an “OR” grouping

  diabetes NOT juvenile

  capacity NOT (mental OR intellectual)
Creating a Boolean Search

1. **ID concepts** *(in LibrarySpeak: “Parse the question”)*

2. **Brainstorm & list specific terms for each concept** *(LibrarySpeak = “Term Harvesting”)*

3. **String together individual synonyms/related terms using OR. Enclose each group in parentheses**

4. **Combine these groups using AND**

5. **Add any “NOT” statements to the end**
Parse the Question: Step 1

• ID the main concepts in your research question

Example:

Does nutrition therapy improve decubitus (pressure) ulcer healing in an elderly patient?

Concepts:

- Nutrition therapy
- Treatment efficacy
- Decubitus/pressure ulcers
- Elderly patients
- Ulcer healing
Harvest Terms: Step 2

- Brainstorm and list terms for each concept

**QUESTION:** Is **Vitamin C** helpful in treating the flu?

<table>
<thead>
<tr>
<th>Concept 1: Influenza</th>
<th>Concept 2: Vitamin C</th>
<th>Concept 3: Treatment</th>
<th>Concept 4: Helpfulness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influenza</td>
<td>Vitamin C</td>
<td>Treatment</td>
<td>Outcome</td>
</tr>
<tr>
<td>Flu</td>
<td>Ascorbic acid</td>
<td>Therapy</td>
<td>Recovery</td>
</tr>
<tr>
<td>Orthomyxovirus</td>
<td>Orange Juice</td>
<td>Management</td>
<td>Success</td>
</tr>
</tbody>
</table>
Group Synonyms: Step 3

Examples:

(influenza OR flu OR orthomyxovirus)
(vitamin C OR ascorbic acid OR ascorbate)
(treatment OR therapy OR management)
(outcome OR recovery OR success)
Combine Synonym Groups: Step 4

Combine the synonym groups with AND:

(influenza OR flu) AND (vitamin C OR ascorbic acid OR orange juice) AND (treatment OR therapy OR management) AND (outcome OR recovery OR success)
Exclude Concepts with NOT : Step 5

Add any NOT statements.

NOT (rats OR mice OR swine)

Note: NOT isn’t used very often
Reverse Engineering a Search Strategy

(epilepsy OR “uncontrolled seizures”) AND ((“health services” OR “delivery of health care” OR treatment OR therapy OR management) AND (appropriate OR recommended OR approved OR accepted OR vetted OR standard)) AND (“health facilities” NOT (“psychiatric hospitals” OR “birthing centers” OR “fitness centers”))

What are the 3 main concepts
Which concepts must be included in all results?
What must be excluded from the results?
Beyond Booleans

• General search techniques
  – Truncation
  – Phrase searching

• Controlled Vocabulary
  – Subject vs. Keyword Searching

• Field Searching

• Limits/Filters
Truncation

Captures variations in search terms (singular, adjective, adverb, present, past, progressive, perfect, passive) to capture any form any author may have used.

You could and sometimes must combine all variations with OR:

(therapy OR therapies OR therapeutics OR therapeutic)

But truncation is easier.

Enter the root word up to the last common character. In most databases you must have at least 3 characters.

therap…..

Then add the database’s symbol for “wildcard” or “truncation”. Most (incl. PubMed, Ebsco databases) use *, others ? or $.

therap* (Check database’s Help/Guide for the correct symbol)
Phrase Searching

Use to search for a set of words in the exact order and without intervening words

“fever of unknown origin”

Most databases will search terms in quotes as phrases but some automatically break them up, searching each term separately and combining them with AND.

Some databases (notably PubMed) will not truncate within a phrase.

Check the database’s Help or Guide or Index page to see how the database handles phrase searching before you use this!
Controlled Vocabulary

A set of standard terms in which

- every term represents a single concept
- only one term is used for that concept

Example: Many words can be used to represent the concept "people who teach."

- teachers
- faculty
- instructors
- professors
- tutors
- educators
- lecturers, etc.

In a controlled vocabulary, one of these will be chosen to represent the concept.

MeSH = Faculty
Faculty, Dental
Faculty, Medical
Faculty, Nursing, etc.
Medical Subject Headings (MeSH): PubMed’s Controlled Vocabulary
Hierarchy of Controlled Vocabulary

Broader Concepts

Narrower Concepts

Health Care Facilities, Manpower, and Service

Ambulatory Care Facilities

Community Health Centers
Substance Abuse Treatment Centers
Community Mental Health Centers
Child Guidance Clinics
Maternal-Child Health Centers
Outpatient Clinics, Hospital
Pain Clinics
Pain Clinics
Surgicenters
Subheadings

Limit retrieval to just 1 or several specific ASPECT(s) of a topic

Vary with subject heading (example: “Organization and Admin” not usually available for diseases)

Ambulatory Care Facilities

Those facilities which administer health services to individuals who do not require hospitalization or institutionalization.
Year introduced: 1983

PubMed search builder options

Subheadings:

- classification
- economics
- education
- ethics
- history
- legislation and jurisprudence
- manpower
- methods
- nursing
- organization and administration
- statistics and numerical data
- supply and distribution
- therapy
- trends
- utilization

☐ Restrict to MeSH Major Topic.
☐ Do not include MeSH terms found below this term in the MeSH hierarchy.
Retail clinics: threat or opportunity?
Stempniak M.

Abstract
The explosion of retail clinics worries some traditional health care providers. But clinic leaders say far from competing with hospitals and physicians, they're helping to build a care continuum.

PMID: 24303633 [PubMed - indexed for MEDLINE]
Related citations

MeSH Terms

MeSH Terms
Ambulatory Care Facilities/economics
Ambulatory Care Facilities/organization & administration
Ambulatory Care Facilities/trends
Commerce/economics
Commerce/trends
Continuity of Patient Care/standards
Continuity of Patient Care/trends
Health Services Accessibility/economics
Health Services Accessibility/organization & administration
Health Services Accessibility/trends
Patient Satisfaction
Primary Health Care/economics
Primary Health Care/organization & administration
Primary Health Care/trends
United States

Indexers assigning subject headings to citations must ID the 2-10 most important subjects in each article.

You can search for just these focused articles or follow their hyperlinks.
Adding “Hidden” Search Terms

• “Explode” term = Searches shown term and all narrower terms beneath the searched term
  – Some databases do this automatically, others don’t
  – In PubMed under the subheadings checkboxes, you can click in a checkbox to “turn off” the automatic exploding so the database will search just general—none of the more specific—subject terms

[Diagram of Ambulatory Care Facilities:
- Community Health Centers
- Substance Abuse Treatment Centers
- Community Mental Health Centers
- Child Guidance Clinics
- Maternal-Child Health Centers
- Outpatient Clinics, Hospital
- Pain Clinics
- Pain Clinics
- Surgicenters]

Do not include MeSH terms found below this term in the MeSH hierarchy.
<table>
<thead>
<tr>
<th>Author</th>
<th>Article Title</th>
<th>Journal Title Abbreviation</th>
<th>Affiliation</th>
<th>Date of Publication</th>
</tr>
</thead>
<tbody>
<tr>
<td>West S</td>
<td>Evidence for Resistance...</td>
<td>J Infect Dis</td>
<td>Johns Hopkins</td>
<td>2014</td>
</tr>
<tr>
<td>Theriot CM</td>
<td>Antibiotic shifts...</td>
<td>Nat Commun</td>
<td>Div Infect Diseases, U Mich</td>
<td>2014</td>
</tr>
<tr>
<td>Aishima S</td>
<td>Histological features...</td>
<td>J Hepatobiliary...</td>
<td>Dept Anatomic Path, Kyushu U</td>
<td>2014</td>
</tr>
<tr>
<td>Cahn A</td>
<td>Establishing multidisciplinary team...</td>
<td>Diabetes Metab Res Rev</td>
<td>Endo &amp; Metab Svc, Hebrew U</td>
<td>2014</td>
</tr>
</tbody>
</table>

RED = FIELD  
BLUE = RECORD  
PURPLE = ONE PIECE OF DATA
Field Searching

Almost all databases will provide you with some ability to search a specific field or fields.

• Speeds search for “known item”
• Not all databases may make all fields searchable
• Each search system requires a specific format.

To limit a search to a particular field, find the correct “Field Tag/Label” and use the required punctuation (in square brackets, followed by a period) or drop-down menu choice.
PubMed Field Tags


[au] = author

[ti] = title

[tw] = textword

[tiab] = title and abstract

[mh] = medical subject heading

[majr] = major medical subject heading

[sh] = medical subheading

[ta] = journal name

[ad] = affiliation

[cn] = corporate author

[ALL] = all fields
Field tags follow the term and are enclosed in square brackets [ ].
They can be used within Boolean statements
They are treated as part of the term within the search strategy.
Subject vs. Keyword Searching

Controlled vocabulary searching

• For a focused search
• Must ID and use appropriate subject heading
• Database searches only in the Subject field for any item in its lists of synonymous “entry” terms

Keyword (textword) searching

• For a comprehensive search
• Must enter all synonyms with OR between them
• Database matches search terms you entered against words located anywhere in record (title, abstract, author name or affiliation, tho not in the full-text)
Combining Subject and Keyword Searching

If you need a comprehensive search, you may need to search with BOTH subject headings and keywords

(diabetes mellitus[mh] OR diabetes[tw])

(sickle cell anemia[mh] OR sickle cell anaemia[tw])
Limits/Filter Options

- Limits or filters restrict retrieval by additional criteria, such as publication type, publication date, language of article, age range, etc.

- Each database’s limits/filter options are unique

- Most limits/filter options appear on the bottom of the Advanced Search page or in the right or left sidebar of your results
PubMed Filters
Combine Previously-Run Searches in “History”
Review: Step-By-Step Search Strategy Construction

1. State your research question
2. Identify the concepts in the question
3. Select the databases
4. For each concept, determine keywords, subject terms, and whether truncation or phrase searching would be useful
5. Combine terms for the same concept with OR and enclose in parentheses
6. Combine these synonym groups AND
7. Put any NOT terms at the end
8. Apply filters as appropriate

When searching databases for a systematic review, you will need to note your search strategies, how many articles were found total, and how many you selected as relevant.
Evaluating Search Results

**Precision** = the fraction of retrieved items that are relevant (How much of what you retrieved is good?)

\[
\frac{\text{# relevant articles retrieved}}{\text{# total articles retrieved}}
\]

**Recall** = fraction of relevant items retrieved out of all relevant items available in the database (How much of the good stuff did you actually get? Unfortunately, the higher the recall, the more 'junk' you end up getting also.)

\[
\frac{\text{# relevant articles retrieved}}{\text{# of total relevant articles available}}
\]

Precision is important if seeking something specific: I need a recent review article on treating disease X.

Recall is important for comprehensive searching: What are all the known side effects of drug Y?

"How many articles should be retrieved by a good search?"

Sorry--no exact answer to that. 100-300 is a reasonable number of abstracts to scan.

Your question, your desired degree of comprehensiveness, and the amount of literature published on your topic all make a single answer to this question impossible.
Storing Search Results

In PubMed:

1. Temporarily store selected results (checkbox, Send to Clipboard)

2. Save selected articles long-term in My NCBI – Collections. My NCBi accounts are free though you must register.

3. OR “Send To” menu to save articles to a file or email them.

In other databases, select citations via checkboxes, then look for save/print/email/export options on the results page or in the ‘Help’ section.
Summary of Key Concepts

• No single database covers all literature; search more than one database.

• Begin by breaking your question into important concepts and listing possible search terms for each concept.

• Truncate to broaden your search; phrase search to narrow to items in which the terms appear adjacent in the order given.

• Use Boolean operators (AND, OR, NOT) to combine search terms.

• If available in the database(s), exploit controlled vocabularies such as MESH to focus your search results.

• Use Field tags to limit the search for your terms in particular fields (author name, affiliation, journal title.)

• Use Limits/Filters such as language, publication date and type, etc. to further narrow your retrieval.
Contacts for Help

Nancy Schaefer
Reference/HSRMP Liaison Librarian
nancys@ufl.edu
352-273-8417

General Help
reference@health.ufl.edu
352-273-8408