Systematic Reviews: Search Process

Hardin Library Reference
lib-hardin@uiowa.edu
319-335-9151
Contact your library liaison for assistance
Objectives and Agenda

This is second session in series

Aims:

- Guide planning for a systematic literature review
- Ensure familiarity with key health sciences databases
- Expand knowledge/skills to begin developing complex search strategies necessary for systematic searches
- Build expertise with the process of devising a complex PubMed search
Conducting a Preliminary Search

Important to search for studies early on, before you have finalized question, to be sure you have sufficient research to address your question.

Search for systematic reviews to see what has been published already, as there is no need to replicate a SR
- PubMed with SR subset
- CINAHL with SR filter
- Use other databases (most have similar filters for reviews)

Search Cochrane and Prospero to see if there are reviews registered
Search Process: Overview

Strive for a sensitive search to ensure that results are meaningful and unbiased

Sensitivity = the number of relevant reports identified divided by the total number of relevant reports in existence

Using different sources important because:

- Different databases index (include) different journals
- Differing interfaces and how search works may yield different results
- Time periods
- Different disciplines

“The conduct of the search for and selection of evidence may have serious implications for patients’ and clinicians’ decisions. An SR might lead to the wrong conclusions and, ultimately, the wrong clinical recommendations.” (IOM, 2011)
Search Process: Overview

The Institute of Medicine recommends working with a librarian or other information specialist to plan out your search strategy and to peer-review the final strategy used.

At least 3 bibliographic databases are typically used for a systematic review, with a comprehensive search strategy, including subject and keyword methods.

Additional search methods to consider after database searching:
- Review of reference lists from relevant articles
- Review of related citations (PubMed feature)
- Review of citing papers
- Hand searching journals of interest
- Author searches
Typical Yield

Large # of results can be intimidating, but are typical

Average # of potentially usable records retrieved from systematic searches is around 3%

“At a conservatively-estimated reading rate of two abstracts per minute, the results of a database search can be ‘scan-read’ at the rate of 120 per hour (or approximately 1000 over an 8-hour period), so the high yield and low precision associated with systematic review searching is not as daunting as it might at first appear in comparison with the total time to be invested in the review” (Cochrane Handbook)
Including Grey Literature

IOM recommends conducting a “web search” in addition to searching databases. Includes conference proceedings, reports and unpublished papers, clinical trials, unpublished guidelines.

Grey literature guide: [http://guides.lib.uiowa.edu/graylit](http://guides.lib.uiowa.edu/graylit)
Literature Database Overview

PubMed
- Produced by the National Library of Medicine, NIH, free resource. Primarily peer reviewed journals (over 5000 included)
- MeSH structure to organize contents- very useful feature for narrowing down results
- Includes all of MEDLINE (records indexed with MeSH)

http://purl.lib.uiowa.edu/nlm/pubmed

CINAHL- Cumulative Index to Nursing and Allied Health Literature
- Variety of source types- includes journal articles, dissertations, drug reports, proceedings…
- Includes many scholarly journals that are not indexed for Medline
- CINAHL headings organize structure- more specific terms available

http://purl.lib.uiowa.edu/ebsco/cinahl
PsycINFO
- Over 3 million records, covering psychology but also linguistics, social work, neuroscience and a few others…
- Records for peer-reviewed journals, books, and dissertations
- Organized by subject terms (“term finder”)
http://purl.lib.uiowa.edu/apa/psycinfo

Embase
- Indexes many international journals, sometimes called the “European MEDLINE”
- Uses subject vocabulary Emtree
- Particularly important for pharmacology topics
http://purl.lib.uiowa.edu/Embase
Objectives and Agenda

Scopus
- Contains over 47 million records, over 4 million conference papers, all of Medline, greater international coverage
- Contains tools that help with visualizing and tracking research, as well as finding citing papers, and determining “impact” of researchers
- Not searchable by subject headings
http://purl.lib.uiowa.edu/scopus

Web of Science
- Citation database that includes all of MEDLINE
- Not searchable by subject headings
- Includes conference proceedings not included in MEDLINE
http://purl.lib.uiowa.edu/wos
Literature Database Structure

They are organized by subject headings— which means that all of the articles contained are read and tagged with headings to assist searchers with locating articles by concept

--also known as controlled vocabulary, thesaurus, descriptors

--each database has its own and some are better than others

They can also be searched by key word- which will sometimes yield larger, less precise results (out of context at times)

If a comprehensive search is needed- both methods of searching should be used
Subject Searching

Subject headings are assigned to articles based on the content of the entire article (not just the title or abstract).

Subject headings are selected from a predetermined, standardized list.

Indexers can’t make up subject headings.

New headings are added annually.

There are not always appropriate headings AND they may be hard to find. Suggested approach is to look at a collection of relevant records and look at the indexing (example coming!)
Use synonyms- Keyword searching will only try to find articles with the exact word that you put in the search box.

Truncation- This can be a powerful search strategy. In a lot of databases, the symbol is “*.” For example, diagnos* will bring up articles with diagnosis, diagnosing, diagnostic, diagnostics, etc

Spelling- A lot of health sciences literature is published in Europe. Try using British spelling alternatives. For instance, pediatrics or paediatrics
Keyword Searching

Proximity searching- Many databases allow you to retrieve records with words near each other, ex: lock* NEAR/3 plat* (Embase)

Field searching- Many databases allow you to search in different fields. One way to limit results to more relevant items is to look for keywords in the abstract or title of an article.

Phrase searching- Many databases use “ “ for exact phrases
Connecting Search Terms

Pressure ulcers AND compression stockings

Using OR will broaden your search results-> synonyms, related terms, spelling variations
- orthopedics or orthopaedics
- bedsore or pressure ulcer or decubitus ulcer
Connecting Search Terms

Using **NOT** will specifically exclude records containing keyword or subject. Suggested use for systematic search is to exclude by subject (Ex: publication type: letters/editorials)

**Parentheses** conveys the order of how you want to database to search. Example—compression stockings AND (bedsore OR pressure ulcer or decubitus ulcer)

Terms in () are searched first and then those results are combined with **AND**

Many database interfaces (any that offer multiple search boxes) will do the ordering automatically.
Using Limits

Use of database limits is generally discouraged. Most limits operate based on the indexing applied to individual records— and if there are errors or omissions in indexing, the sensitivity of your search may be compromised.

The exception to this is the English and date filters.

• Use English filter only when one of your exclusion criteria is non English publication.
• Use the date range filter only if you have a specific reason to restrict older publications. An example might be that you are updating a previous systematic review.
Using Filters

Many search filters have been developed and tested specifically for use in systematic literature searches. Most of these are designed with a combination of subject terms and keywords to optimize recall/sensitivity.

Example for randomized controlled trials:
(clinical[tiab] AND trial[tiab]) OR "clinical trials as topic"[mesh] OR "clinical trial"[pt] OR random*[tiab] OR "random allocation"[mesh] OR "therapeutic use"[sh]

Testing and Reviewing the Search

It is important to test the search strategy to be sure that it capture relevant citations included in the database searched. This can be done by searching for the citations included in your sample of relevant citations, and combining each search with the final search strategy.

If a citation is not included, verify that the journal and the coverage dates are included in the database. If the citation should have been captured, it is important to determine where the search strategy failed, in order to strengthen it.

It is recommended that at least one other qualified individual reviews the final search strategy to identify formatting or grammatical errors.
Saving Searches

Consider creating an account in each of the databases to save each search when it is near completion or finalized. This will make it easier to re-run searches during the review, to determine if new citations pertain.

Saving screen shots or pasting in your exact search strategy with # of results into a separate document is also suggested. This will help with reporting search later on, and is also important if there are technical issues with a database.
Generating Terms

This process usually takes a few days/weeks:

• Start with small list of relevant citations
• Look at the subject terms assigned to those that are relevant and be sure to include those
• Read a relevant article or read about topic online to get ideas for synonyms
• Look at similar systematic review and the search strategies supplied…
• Collaborate to generate list
## Generating Terms: Example

<table>
<thead>
<tr>
<th>Concept #1</th>
<th>Concept #2</th>
<th>Concept #3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Brain health</strong></td>
<td><strong>Sleep</strong></td>
<td><strong>Interventions</strong></td>
</tr>
<tr>
<td><strong>Subject terms</strong></td>
<td><strong>Subject terms</strong></td>
<td><strong>Subject terms</strong></td>
</tr>
<tr>
<td>Cognition</td>
<td>Sleep</td>
<td>Exercise</td>
</tr>
<tr>
<td>Cognition disorders</td>
<td>Sleep initiation and maintenance disorders</td>
<td>Meditation</td>
</tr>
<tr>
<td>Thinking</td>
<td></td>
<td>Relaxation</td>
</tr>
<tr>
<td>Executive function</td>
<td></td>
<td>Therapy</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th><strong>Keywords/Phrases</strong></th>
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<tbody>
<tr>
<td>brain health</td>
<td>Sleep</td>
<td>Physical activit (y,ies)</td>
</tr>
<tr>
<td>brain function</td>
<td>Insomnia (s)</td>
<td>Exercise (s)</td>
</tr>
<tr>
<td>Memory</td>
<td>Rapid eye movement (s)</td>
<td>Light therapy</td>
</tr>
</tbody>
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Resources

Hardin Library guide for Systematic Reviews: http://guides.lib.uiowa.edu/systematicreviews

PRISMA guidelines for reporting: http://www.prisma-statement.org/index.htm

Grey Literature Guide: http://guides.lib.uiowa.edu/graylit

Endnote guides
EN Basic: http://www.lib.uiowa.edu/hardin/endnotebasic/
EN Desktop: http://www.lib.uiowa.edu/hardin/endnote-x7/
Resources
