Searching the Literature: Concepts, Resources & Searching Skills
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Agenda

• The Steps to Searching
• Why Controlled Vocabulary is Important
• Controlled vocabulary searching in PubMed
• Important Database features
• PubMed searching techniques and mechanics
• Reminders and final thoughts

Effective Literature Searching: the steps
1. Identify your topic (and write it down!)
2. Identify applicable resources
3. Create a list of controlled vocabulary terms, synonyms and related terms
4. Conduct your search
5. Record your findings
6. Critically evaluate the information
Literature Searching Overview

- Define the purpose of your search
- Form your question
  - Write it down!
- Now identify relevant databases and resources
- Create a search query from your question – for use within a specific database!
  - Identify the key concepts (often 2-3 sometimes more) in your question
  - Find searchable terms for these concepts: most specific controlled vocabulary terms as well as keyword phrases
  - Group into distinct sets the terms that represent/describe each main concept with Boolean “OR”
  - Combine sets with Boolean “AND”

Searching Overview Cont.

- Run your search query
- Revise the query until you are satisfied
  - Remember, a good search query usually incorporates controlled vocabulary terms from the database along with keywords/phrases.
- Record and store your findings
  - Strategies can be saved in MyNCBI & in Word Documents – good for making notes to self; citations can be saved in RefWorks or other citation management programs.
- Revisit/revise the search query for each distinct database you search
- Evaluate the findings and critically appraise the articles

What’s the big deal with controlled vocabulary?

- It provides a consistent, precise way to retrieve information when different natural language words/phrases (synonyms) are used for the same concept, or when the same natural language is used for different concepts! (e.g. “cold” Which meaning?)
- Controlled vocabulary terms control for spelling variations (think Brit v. Am. Eng.), plurals, acronyms.
- Why do we say cont. vocab. searching is precise? – because only articles indexed with that vocabulary term are retrieved.
- Select the most specific cont. vocab. term available for your concept; that’s how indexers apply them!
### Database-specific Controlled Vocabularies

<table>
<thead>
<tr>
<th>Some major databases</th>
<th>Has controlled vocabulary?</th>
</tr>
</thead>
<tbody>
<tr>
<td>PubMed</td>
<td>YES – MeSH</td>
</tr>
<tr>
<td>Cochrane Library</td>
<td>YES – MeSH</td>
</tr>
<tr>
<td>EMBASE</td>
<td>YES – Emtree</td>
</tr>
<tr>
<td>Web of Science</td>
<td>No</td>
</tr>
<tr>
<td>SCOPUS</td>
<td></td>
</tr>
<tr>
<td>PsycINFO</td>
<td>YES – Thesaurus</td>
</tr>
<tr>
<td>Global Health</td>
<td>YES – Thesaurus</td>
</tr>
<tr>
<td>CINAHL</td>
<td>YES – CINAHL Headings</td>
</tr>
<tr>
<td>ERIC</td>
<td>YES – Descriptors</td>
</tr>
</tbody>
</table>

### Controlled vocabulary in PubMed

- **MeSH (Medical Subject Headings)**
  - NLM’s controlled vocabulary to search Medline (PubMed)
  - Over 26,000 terms
  - Don’t guess – check the MeSH Database for what the controlled vocabulary term is for your concept.

<table>
<thead>
<tr>
<th>Natural Language</th>
<th>MeSH Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health screening</td>
<td>Nursing (MeSH)</td>
</tr>
<tr>
<td>Emergency department</td>
<td>Emergency Services, Hospital (MeSH)</td>
</tr>
<tr>
<td>Computed tomography</td>
<td>Tomography, X-Ray Computed (MeSH)</td>
</tr>
<tr>
<td>SARS</td>
<td>SARS Virus (MeSH); Severe Acute Respiratory Syndrome (MeSH)</td>
</tr>
<tr>
<td>Reproductive health</td>
<td>Reproductive Medicine (MeSH); Reproductive Health Services (MeSH)</td>
</tr>
</tbody>
</table>

### Step #1: Write Down Your Question
Then Identify Your Main Concepts

“What are the treatment margins being used in stereotactic body radiotherapy for lung cancer?”

Concepts:

(Concept 1) margins
(Concept 2) stereotactic body radiotherapy
(Concept 3) lung cancer

Now we translate the main concepts from your question into a searchable query

Concepts to Query

(Concept 1) margins
(Concept 2) stereotactic body radiotherapy
(Concept 3) lung cancer

Becomes (for a PubMed Search):

(“margin”) AND ("Radiosurgery"[MeSH] OR "stereotactic body radiotherapy" OR "SBRT" OR "body radiosurgery" OR "extracranial radiosurgery") AND ("lung neoplasms"[MeSH] OR "lung cancer")
Get To Know Your Databases’ Features

Does a database include/allow:
- Automatic term mapping?
- A controlled vocabulary for use in searching?
- Vocabulary designated as major focus?
- Boolean operators (AND, OR, NOT)
- Syntax Requirements – e.g. “around keyword phrases” in PubMed to override Automatic Term Mapping; ‘around keyword phrases’ in EMBASE.
- Field tag searching? – e.g. [tiab] in Pubmed

Questions?

Now let’s do another example in PubMed...
I will also show you:
- How to force keyword strings using double quotes
- Where the details box is and why you should pay attention to it
- How to send terms from MeSH database to PubMed and run the search
- How to combine concept sets with Boolean operators
- Open a MyNCBI account (important for saving searches AND NIH Public Access Policy Compliance – Bibliography Management)
Databases Other Than PubMed

• Regardless of where you are searching, the process is the same.
• Always write down your question, identify the main concepts, create a searchable query by combining database-specific controlled vocabulary with keyword terms and phrases, perform the search, and evaluate the results.

Reminders

• Testing/revising your search strategy:
  – It’s not about the number of hits per se. It’s whether the strategy captured on-topic target articles – but not too many off-topic articles. It’s a trade-off: precision v. recall (kind of like specificity v. sensitivity)
  – Read a random sample of abstracts from your results.
  – Investigate why you got outlier articles.
  – Review the record for an on-topic article from your results to see the controlled vocabulary terms (e.g. in “Medline” display in PubMed) that were applied.

Reminders - cont.

• Continue to review your question – has it changed/evolved?
• Consult an expert searcher – your department’s assigned informationist – for your literature searches.
  http://welch.jhmi.edu/welchone/node/19
• Invite her or him to be a team member, esp. on systematic reviews and content analyses, where the search results are the critical “inputs” for the project.
Final Thoughts

• To get started off on the right foot, make sure you have a good question.

• Literature searching is a combination of art and science.

• It requires practice, intuition, and some trial and error.

Questions?

Thanks!