Developing Search Strategy For Systematic Review

NUR5203 Evidence-based Healthcare MSc (Nursing)

26 August 2019 (9.00 – 11.30 am)

Presented by Annelissa CHIN and Suei Nee WONG
Venue: LT37, MD1 level 3

Course materials downloadable in Nursing and Allied Health Subject Guides (Library Instructions & Tips) at
http://libguides.nus.edu.sg/c.php?g=145551&p=955833
Course Outline

- Formulate a focused question
- Identify sources of information
- Developing search strategy
- Searching
  - The Cochrane Library
  - PubMed database
  - Embase database
  - CINAHL database
  - Scopus database
- Reporting search results
Formulate A Focused Question

PICO Framework
Formulate a Focused Question

Focused Question: *What is the effectiveness of hydrotherapy for the management of rheumatoid arthritis?*

- **Patient or Population or Problem**: Patients with rheumatoid arthritis
- **Intervention (or Exposure)**: hydrotherapy
- **Comparison**: No treatment or other
- **Outcome**: reduction in pain, improving the health status

- Type of question you are asking
- Type of study design you would want to find
Identify the Search Concepts

Question: What is the effectiveness of hydrotherapy to the management of rheumatoid arthritis?”

<table>
<thead>
<tr>
<th>Population/Patient (P)</th>
<th>Intervention (I)</th>
<th>Comparator (C)</th>
<th>Outcome (O)</th>
</tr>
</thead>
<tbody>
<tr>
<td>rheumatoid arthritis</td>
<td>hydrotherapy</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>hydrotherapies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>juvenile idiopathic arthritis</td>
<td>aquatherapy</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>aquatherapies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>juvenile arthritis</td>
<td>water therapy</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>aquatic therapy</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Identify Sources of Information

Subject Guides on Systematic Reviews
http://libguides.nus.edu.sg/c.php?g=145717&p=2476270
Refer to ‘Where To Search’
Developing Search Strategy -
the Search Syntax -

- Boolean Operators
- Phrase Searching
- Truncation
- Brackets/Parenthesis
**Boolean Operators**

**OR** either terms may be present  
→ more results  
E.g. hydrotherapy **OR** aquatherapy

**AND** both terms must be present  
→ fewer results  
E.g. elderly patients **AND** fall

**NOT** → Use with caution  
E.g. humans **NOT** animals

**Note:** In PubMed, Boolean operators ‘AND’, ‘OR’, and ‘NOT’, must be entered in UPPERCASE.
More Search Syntax

PHRASE SEARCHING (double quotation mark)
“water therapy”
“aquatic therapy”

TRUNCATION (marked with an asterisk*)
therap* → therapy, therapies, therapeutic, therapeutics, etc.

Note: PubMed used only the first 600 variations.

BRACKETS/PARENTHESIS

(therapy OR therapies) AND (water OR aqua OR aquatic OR hydro)

Grouping terms using parenthesis
Question: What is the effectiveness of hydrotherapy to the management of rheumatoid arthritis?”

<table>
<thead>
<tr>
<th>Population/Patient (P)</th>
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<th>Comparator (C)</th>
<th>Outcome (O)</th>
</tr>
</thead>
<tbody>
<tr>
<td>“rheumatoid arthritis”</td>
<td>hydrotherapy</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>hydrotherapies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“juvenile idiopathic arthritis”</td>
<td>OR</td>
<td>aquatherapy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>aquatherapies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“juvenile arthritis”</td>
<td>“water therapy”</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>“aquatic therapy”</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Scoping Search

Searching The Cochrane Library
Click at Advanced tab, type the following into the Search Box:

`rheumatoid arthritis AND (hydrotherapy OR water therapy OR aquatic therapy)`
Question: What is the effectiveness of hydrotherapy to the management of rheumatoid arthritis?
Identify Keywords for your topic

Refer to the search strategy from the Cochrane review to find out the search terms used on your topic

Electronic searches

We searched the Cochrane ‘Rehabilitation and Related Therapies’ Field Register (to December 2014), the Cochrane Central Register of Controlled Trials (2013, Issue 1), MEDLINE (1950 to December 2014), EMBASE (1988 to December 2014), the Cumulative Index to Nursing and Allied Health Literature (CINAHL) (1982 to December 2014), the Allied and Complementary Medicine Database (AMED) (1985 to December 2014), PsycINFO (1806 to December 2014) and the Physiotherapy Evidence Database (PEDro) (to December 2014). We applied no language restrictions, but studies not reported in English, Dutch, Danish, Swedish, Norwegian, German or French are awaiting assessment.

We also searched the WHO International Clinical Trials Registry Platform for ongoing and recently completed trials.

In MEDLINE, the subject-specific strategy was combined with the sensitivity- and precision-maximising version of the Cochrane Highly Sensitive Search Strategy (Higgins 2011a) used to identify randomised trials in MEDLINE and modified for use in other databases.

Search strategies performed in MEDLINE, CENTRAL, EMBASE and CINAHL are presented in Appendix 1.
Developing Search Strategy - Identify the Search Concepts

- **Subject Headings**
  Thesauri or indexed terms of the databases
  - MeSH (Medical Subject Headings) -- MedLine
  - Emtree -- Embase database
  - CINAHL Headings -- CINAHL database

- **Keywords /Text word**
  Search for words in the document
Searching PubMed Database


Note: You can also logon to Library Portal to access PubMed to download full text articles subscribed by NUS Library

Building Search Strategy for Patient (P) term --rheumatoid arthritis

Follow the steps below:

1. Search the MeSH terms
2. Link the list of keywords
3. Combine MeSH terms and Keywords using ‘OR’ operator
Search the MeSH Database for ‘P’ term

At the MESH dropdown menu, select ‘MESH’ to search the MESH database for ‘patient’ term on ‘Rheumatoid arthritis’

Combining the 2 Mesh terms for patient (‘P’) with ‘OR’ operator

1. Arthritis, Rheumatoid
   - A chronic systemic disease, primarily of the joints, marked by inflammatory changes in the synovial membranes and articular structures, widespread fibrinoid degeneration of the collagen fibers in mesenchymal tissues, and by atrophy and rarefaction of bony structures. Etiology is unknown, but autoimmune mechanisms have been implicated.

2. Arthritis, Juvenile
   - Arthritis in children, with onset before 16 years of age. The terms juvenile rheumatoid arthritis (JRA) and juvenile idiopathic arthritis (JIA) refer to classification systems for chronic arthritis in children. Only one subtype of juvenile arthritis (polyarticular-onset, rheumatoid factor-positive) clinically resembles adult rheumatoid arthritis and is considered its childhood equivalent.
Building Keyword Search Strategy for ‘P’ term

P = rheumatoid arthritis

"rheumatoid arthritis"[tiab] OR “juvenile idiopathic arthritis”[tiab] OR “juvenile arthritis”[tiab]

Use quotation marks (" ") to search phrase [tiab] to search in either ‘title’ or ‘abstract’ field

Note: When searching for phrase in PubMed, leave out the quotation marks (" ").
Searching Keyword for ‘P’ term in PubMed


Search results
Items: 1 to 20 of 106079

1. Juvenile Idiopathic Arthritis.
   Barut K, Adrovic A, Şahin S, Kasapçopur Ö.
   PMID: 28418334   Free PMC Article
   Similar articles

2. Skin Manifestations of Rheumatoid Arthritis, Juvenile Idiopathic Arthritis, and Spondyloarthritis.
   Chua-Aguilera CJ, Möller B, Yawalkar N.
   PMID: 28752373   Similar articles

3. Juvenile idiopathic arthritis overview and involvement of the temporomandibular joint:

Copy and paste the keyword below into search field above
rheumatoid arthritis[tiab] OR juvenile idiopathic arthritis[tiab] OR juvenile arthritis[tiab]
Combine MeSH and Keyword for ‘P’ term

1. Click the ‘Add’ tab to add search statement #1 to the Search Builder box. Likewise for search statement #2
2. Combine searches with ‘OR’ operator
3. Click ‘Add to history’. You have completed the search for for ‘P’ terms as shown in search statement #3

Use the builder below to create your search

Search Builder

All Fields

"rheumatoid arthritis"[tiab] OR Juvenile rheumatoid arthritis[tiab] OR juvenile idiopathic arthritis[tiab]

"Arthritis, Rheumatoid"[Mesh] OR "Arthritis, Juvenile"[Mesh]

Search or Add to history

Search History

<table>
<thead>
<tr>
<th>Search</th>
<th>Add to builder</th>
<th>Query</th>
<th>Items found</th>
</tr>
</thead>
<tbody>
<tr>
<td>#3</td>
<td>Add</td>
<td>Search (((&quot;Arthritis, Rheumatoid&quot;[Mesh]) OR &quot;Arthritis, Juvenile&quot;[Mesh])) OR (rheumatoid arthritis[tiab] OR juvenile idiopathic arthritis[tiab] OR juvenile arthritis[tiab])</td>
<td>150022</td>
</tr>
<tr>
<td>#2</td>
<td>Add</td>
<td>Search rheumatoid arthritis[tiab] OR juvenile idiopathic arthritis[tiab] OR juvenile arthritis [tiab]</td>
<td>106227</td>
</tr>
<tr>
<td>#1</td>
<td>Add</td>
<td>Search (&quot;Arthritis, Rheumatoid&quot;[Mesh]) OR &quot;Arthritis, Juvenile&quot;[Mesh]</td>
<td>118387</td>
</tr>
</tbody>
</table>
Building Search Strategy for *Intervention (I)* term -- hydrotherapy

1. Find the MeSH terms
2. Link the list of keywords
3. Combine MeSH terms and Keywords using ‘OR’ operator
Search the MeSH database for ‘I’ term

4. Search the MeSH for ‘I’ term on ‘hydrotherapy’ (see #4 in Slide 29)
Searching keyword for ‘I’ term

Building Keyword Search Strategy for ‘hydrotherapy’

( water OR aqua OR aquatic OR hydro ) AND

( therapy OR therapies OR therapeu* OR physiotherap* )

OR hydrotherapy* OR aquatherap*

(water[tiab] OR aqua[tiab] OR aquatic[tiab] OR hydro [tiab])
AND (therapy[tiab] OR therapies[tiab] OR therapeu*[tiab]
OR physiotherap*[tiab]) OR hydrotherapy[tiab] OR aquatherapy[tiab]

Append [tiab] to the search terms
Combine MeSH and Keyword for ‘I’ term

5. Build the following search for keywords related to ‘hydrotherapy’ (see #5)


6. Combining MeSH (#4) & keywords(#5) for Intervention (‘I’) term (see #6)

<table>
<thead>
<tr>
<th>Search</th>
<th>Add to builder</th>
<th>Query</th>
<th>Items found</th>
</tr>
</thead>
<tbody>
<tr>
<td>#4</td>
<td>Add</td>
<td>Search &quot;Hydrotherapy&quot;[Mesh]</td>
<td>19646</td>
</tr>
<tr>
<td>#3</td>
<td>Add</td>
<td>Search (((&quot;Arthritis, Rheumatoid&quot;[Mesh]) OR &quot;Arthritis, Juvenile&quot;[Mesh])) OR (rheumatoid arthritis[tiab] OR juvenile idiopathic arthritis[tiab] OR juvenile arthritis[tiab])</td>
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<td>Add</td>
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<td>106227</td>
</tr>
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<td>#1</td>
<td>Add</td>
<td>Search (&quot;Arthritis, Rheumatoid&quot;[Mesh]) OR &quot;Arthritis, Juvenile&quot;[Mesh]</td>
<td>118387</td>
</tr>
</tbody>
</table>
Combining ‘P’ AND ‘I’ terms with ‘AND’ operator

<table>
<thead>
<tr>
<th>Search</th>
<th>Add to builder</th>
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<td>118387</td>
</tr>
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</table>

#3 Combining ‘P’ terms (#1 AND #2)

#6 Combining ‘I’ terms (#4 AND #5)

#7 Combining ‘P’ AND ‘I’ (#3 AND #6)
Refining Search Using PubMed Filter

- Article types: Clinical Trial, Review
- Filters: Manage Filters
  - Sort by: Best match, Most recent
  - Search details: ("Arthritis, Rheumatoid"[Mesh] OR "Arthritis, Juvenile"[Mesh]) OR (rheumatoid arthritis...)

[Image of PubMed website interface]
MY NCBI Account

Saves your search and emails new articles on your topic
Requires NCBI account; you can also sign in via Google

Sign in to NCBI

Sign in with

Google Login Commons

See more 3rd party sign in options

Sign in directly to NCBI

NCBI Username
Password

Keep me signed in

Sign In

Forgot NCBI username or password?

Register for an NCBI account

My NCBI features include:

• Save searches & automatic e-mail alerts
• Display format preferences
• Filter options
• My Bibliography & NIH public access policy compliance
• SciENcv: a researcher biosketch profile service
• Highlighting search terms
• Recent activity searches & records for 6 months
• LinkOut, document delivery service & outside tool selections
Save Search & Create Alerts

Your search strategy

Setup Email Alert
## Keywords vs MeSH

<table>
<thead>
<tr>
<th>Keyword</th>
<th>MeSH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less precise</td>
<td>More precise</td>
</tr>
<tr>
<td>Broader results</td>
<td>Narrower results</td>
</tr>
<tr>
<td>Retrieves all kinds of records, including the current studies (as supplied by publisher)</td>
<td>Retrieves citations indexed with MeSH terms. Slightly dated studies (time lag, older)</td>
</tr>
<tr>
<td>Useful when there is no MeSH term available to represent the concept</td>
<td>Consistent way to retrieve information that may use different terminology for the same concept</td>
</tr>
</tbody>
</table>
Searching Embase (Embase.com) -- Using PICO Search Form

Replicate your search using EMBASE database

What is the effectiveness of hydrotherapy to the management of rheumatoid arthritis?”
Begin your search with the PICO Search Form

1. Click SEARCH tab
2. Select PICO tab
3. Select ‘Find best term’
4. Fill in the PICO Search Form

Fill in Population terms (Combine EMTREE headings + Synonyms)

Fill in Intervention terms (Combine EMTREE headings + Synonyms)
In the ‘Find best term’ box, type the population (P) term ‘rheumatoid arthritis’. EMTREE suggested to use the preferred term ‘rheumatoid arthritis’ and 19 synonyms as a free text term.
The PICO Search Form – ‘Population’ terms

1. Select the appropriate synonyms to expand your search terms or just accept the default synonyms.

2. Click at the triangle sign to see the drop down box below.

3. Check the radio button next to the ‘ti,ab’ to focus the search of synonyms to either title or abstract field.
Type ‘hydrotherapy’ into the ‘Intervention’ PICO search form, EMTREE suggested the preferred term ‘hydrotherapy’ and 4 synonyms.

The PICO Search from will automatically combine the ‘Population’ and ‘Intervention’ terms to display the search results.
The search strategy is shown in the **History** option.

Use ‘**Edit**’ to modify the search strategy.
Emtree (index terms used in EMBASE)

Advanced Search

1. Emtree
2. Type word or phrase (without quotes)
   dementia
3. Find Term

AIDS dementia
use preferred term: HIV associated dementia
AIDS dementia complex
use preferred term: HIV associated dementia
AIDS related dementia
use preferred term: HIV associated dementia
ale dementia
Keyword Search
Advanced Search
SEARCH HISTORY / COMBINE SEARCH

ADVANCED SEARCH
Searching CINAHLPlus with Full Text (EBSCO Host)

Research Question:

Systematic review on “Tea consumption in delaying and preventing the onset of Alzheimer’s disease”
### CINAHL - Search Strategy

**Questions:** Systematic review on “Tea consumption in delaying and preventing the onset of Alzheimer’s disease”

Brainstorming for text word/keyword

<table>
<thead>
<tr>
<th>Patient</th>
<th>Intervention</th>
<th>Comparator</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>dementia</td>
<td>tea (black tea, oolong tea, green tea, herbal tea, etc.)</td>
<td>non-tea drinkers or alternative</td>
<td>Preventing or postponing the onset of Alzheimer's disease</td>
</tr>
<tr>
<td>Alzheimer's disease</td>
<td></td>
<td></td>
<td>preventing progression of MCI to dementia</td>
</tr>
</tbody>
</table>
1. Using “CINAHL Headings”/ Suggest Subject Terms to search subject heading
2. Using “Advanced Search” to combine subject headings and text words to search comprehensively
1. Enter search term ‘dementia’ into the search box
2. Click at the checkbox to select the CINAHL heading (You will see subheadings and the Search Database displayed on the right)
3. Explode the terms by ticking the checkbox
4. Click at Search Database to execute your search
1. Copy and paste the search terms below in the **Advanced Search field**:

```
dementia OR dementias OR Alzheimer OR Alzheimer’s OR senile
```

2. At the “Select a field” option, select the “Title field”

3. Do a separate search for terms in the “Abstract field”

4. Combine the two searches with ‘OR’

5. Click Search
1. Repeat the same steps to search for subject heading for ‘tea’.
2. Copy and paste the keywords on ‘tea’ as
   \[ \text{tea OR teas OR “camellia sinensis”} \]
3. Change the Boolean operator to ‘OR’
4. Search the keywords in title and abstract field.
5. Click on ‘Search History’
6. Combine your search results
Combining CINAHL Headings and Keyword

1. Click at the ‘Search History’ to view your search results
2. Select search S1 and S2 by ticking the check box
3. Combine the searches by clicking “Select with OR” option
4. Combine S4 and S5 with “AND”
5. You will retrieve 128 studies.
Searching Scopus (Elsevier)

Research Question:

Systematic review on “Tea consumption in delaying and preventing the onset of Alzheimer’s disease”
On the *Advanced search* page, you can conduct an advanced search using a large number of field names and other advanced search parameters.

On the *Document Search* page, you can conduct both simple and more advanced searches using common search parameters.
Scopus(Elsevier) - TITLE-ABS-KEY field

Build search strategy for ‘Patient’ term
1. In the ‘Enter query string’ search box, enter the ‘Patient’ term shown below
2. Enter ‘Intervention’ term as shown
2. Click Search (magnifying glass)

dementia OR dementias OR Alzheimer OR Alzheimer’s OR senile

tea OR teas OR “camellia sinensis”
From the results page, the following options are available: **Export**, Download and **View Citation Overview** plus the **View Secondary Documents** and **Analyze Search Results** options.

<table>
<thead>
<tr>
<th>Document title</th>
<th>Authors</th>
<th>Year</th>
<th>Source</th>
<th>Cited by</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Synaptic modification by L-theanine, a natural constituent in green tea, rescues the impairment of hippocampal long-term potentiation and memory in AD mice</td>
<td>Zhu, G., Yang, S., Xie, Z., Wan, X.</td>
<td>2018</td>
<td>Neuropharmacology 138, pp. 331-340</td>
<td>0</td>
</tr>
<tr>
<td>3 Inhibition of Aβ(1-42)-induced Aβ42 fibrillation and reduction of neurotoxicity by epigallocatechin-3-gallate nanoparticles</td>
<td>Singh, N.A., Mandal, A.K.A., Khan, Z.A.</td>
<td>2018</td>
<td>Journal of Biomedical Nanotechnology 14(6), pp. 1147-1158</td>
<td>0</td>
</tr>
</tbody>
</table>
Reporting Searches

Search Methods for identification of studies

- The name of the database searched
- Information of other sources searched
- The date when the search was run
- The years covered by the search
- Limits applied (e.g., publication type, language)
- The detailed search strategies in the Appendix

PRISMA flow diagram

Record the number of search results retrieved for each database and fill this total number in the PRISMA flow diagram.

Electronic searches

We searched the Cochrane ’Rehabilitation and Related Therapies’ Field Register (to December 2014), the Cochrane Central Register of Controlled Trials (2013, Issue 1), MEDLINE (1950 to December 2014), EMBASE (1988 to December 2014), the Cumulative Index to Nursing and Allied Health Literature (CINAHL) (1982 to December 2014), the Allied and Complementary Medicine Database (AMED) (1985 to December 2014), PsycINFO (1806 to December 2014) and the Physiotherapy Evidence Database (PEDro) (to December 2014). We applied no language restrictions, but studies not reported in English, Dutch, Danish, Swedish, Norwegian, German or French are awaiting assessment.

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Searching other resources

We also searched the reference lists of articles and contacted experts in the field.
• PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-analyses)

• A transparent way of reporting your search results of systematic reviews and meta-analyses
Summary: Developing Search Strategy

Formulate a focus question using PICO

Using ‘OR’ to combine terms
Within PICO to broaden the search

Refine search using more specific term or apply ‘FILTER’ to further narrow the search if necessary

Using ‘AND’ to combine searches across P and I concepts to narrow the search

1. Patient (P)
   (MeSH headings or text words)
   OR

2. Intervention (I)
   (MeSH headings or text words)
   OR

3. Study types
   e.g. Systematic reviews, RCTs

FILTER option
Thank you

Your feedback is much appreciated.