All aspects of a systematic review should be systematic – including the search!
Today

- Where and how
- Methodological search filters
- Reporting the search
- Bibliographic software
- Anything else?
<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Structure the question</td>
<td>Categorize the elements of the search and decide what it is really about</td>
</tr>
<tr>
<td>2.</td>
<td>Choose databases/sources</td>
<td>The choice is based on the topic of the review, the type of question the review seeks to answer &amp; the time/resources available</td>
</tr>
<tr>
<td>3.</td>
<td>Create search strategies for the selected sources</td>
<td>Identify relevant search terms for the different categories of the question. Create search strategies for each included source and add relevant search filters if desired/possible. Carry out the searches.</td>
</tr>
<tr>
<td>4.</td>
<td>Review results and revise search strategies if necessary</td>
<td>If the search generates too many irrelevant hits/ or leaves out relevant references, search strategies should be revised. New sources should also be considered.</td>
</tr>
<tr>
<td>5.</td>
<td>Process references</td>
<td>Import references from all sources to bibliographic software, remove duplicates etc.</td>
</tr>
<tr>
<td>6.</td>
<td>Log and report the search</td>
<td>Decisions made throughout the search process should be logged. Describe the search in the methods section of the review. Place search strategies in an appendix.</td>
</tr>
<tr>
<td>7.</td>
<td>Update the search if necessary</td>
<td>If the review needs updating or if the review project takes a long time, the search will have to be carried out again.</td>
</tr>
</tbody>
</table>

**Systematic**
The way the search strategy is developed

**Transparent**
How well the search is reported

**Adequately comprehensive**
The level of ambition for the search needs to be consistent with the level of ambition for the review or the project
- Vision: to "vacuum" the world
- Possible?

- The balance specificity and sensitivity
Choose sources

• The importance of multiple sources

Choose sources

• Databases
  – ERIC
  – PsycINFO
  – Sociological Abstracts
  – etc, etc etc
• Pearl growing
• Citation searches
• Contacting experts
• Hand searching
• Ongoing studies
• Grey literature
Choose sources: pearl growing

Citation pearl growing (from Wikipedia)
Citation pearl growing is the act of using one relevant source, or citation, to find more relevant sources on a topic. The searcher usually has a document that matches a topic or information need. From this document, the searcher is able to find other keywords, descriptors and themes to use in a subsequent search.

Choose sources: citation searches

- Reference lists of identified studies
- References cited in existing systematic reviews and meta analyses (included AND excluded studies!)
- Researchers may use different words to describe the same concepts, and these variations may not have been remedied by database indexers*
- ISI Web of Knowledge

*7% of the included studies in a social science systematic review were located through citation searching alone (Papaioannou 2009)
Citation index

- To identify references to studies that refer to included studies
- Also as a primary source of studies in its own right, but less user friendly ...

Choose sources: contacting experts*

- E-mail, telephone, letters, mailing lists…

* 23.8% of the included studies in systematic review were located through contacting experts (Helmer 2001)
Choose sources: hand searching

- Labour intensive process!
- Alternatively: consider only manually scanning the Table of Contents of the most current issues of those journals in which a large number of included studies have been found
Grey literature

“That which is produced on all levels of government, academics, business and industry in print and electronic formats, but which is not controlled by commercial publishers.” Fourth International Conference on Grey Literature
Grey literature

- Publication bias is the tendency of researchers, editors, and pharmaceutical companies to handle the reporting of experimental results that are positive (i.e. showing a significant finding) differently from results that are negative (i.e. supporting the null hypothesis) or inconclusive, leading to bias in the overall published literature.
- But also, in some areas, a lot of studies published on e.g. websites only

Grey literature

- OpenGrey System for Information on Grey Literature in Europe
  [http://www.opengrey.eu/](http://www.opengrey.eu/)
- Google, Google Scholar, specific websites, some databases…
Developing a search strategy!

Problem  →  question

Rephrase the problem into a question that may be answered by the literature
Plan your search

- Identify major ideas (key concepts) in your topic sentence
- Find terms for these key concepts
- Think of synonym terms to describe these key concepts

PICO → strategy

| Population | Intervention | Comparison | Outcome |

OR

AND
Where do I find search terms?

• Colleagues and experts on the subject
• Journal articles or books on the same subject
• Scope notes of database subject headings
• Dictionaries/Wikipedia
• Use a relevant study (if possible), identify the reference to this study in the databases you will be searching. How is it indexed?

Searching for text words and subject headings

Author(s): Knai C, Pomerleau J, Lock K, McKee M.
Title: Getting children to eat more fruit and vegetables: a systematic review
Source: Preventive Medicine, 42(2):85-95
Publication year: 2006
Abstract: There is growing recognition of the need to increase consumption of currently suboptimal levels of fruit and vegetables by children, given their known beneficial effects for health. There is, however, a need for a synthesis of the evidence on interventions …

Subject heading(s): Adolescent; Child; Child-Nutrition; Child,-Preschool; Food-Habits; Fruit; Health-Promotion/mt [methods]; Intervention-Studies; Vegetables; World-Health
1. **Exercising attention within the classroom.**

   **[References]**

   IR, Jane Williams, Austin A. G. Roberts, Lynn Miller, Anne Thorace, Jeremy Gwinn, Jason Williams, Val, Man-Williams, Mark.


   Published: 2010-09-02.

   **Publications**

   Journal:
   - Developmental Medicine & Child Neurology

   **Year:** 2010

   **Volume:** 52

   **Issue:** 10

   **Pages:** 879-881

   **Keywords**

   - Exercise, Motor Skills, Physical Education, Psychological Performance, Study Design

   **Subject Headings**

   - Exercise, Motor Skills, Psychological Performance, Study Design

   **Abstract**

   The study investigated whether increased physical exercise during the school day improved subsequent cognitive performance in the classroom. The participants were 124 children aged 8-11 years. Children were randomly assigned to either an active intervention group (AIG) or a control group (C). The AIG received a 15-minute, classroom-based programme of physical exercise delivered at least twice a week. The C group received the standard classroom curriculum. At the end of the intervention period, all children completed a cognitive skills test which included tasks such as attention, memory, and problem-solving. The results showed that children in the AIG performed better on the cognitive skills test compared to the C group. This suggests that increased physical exercise may improve cognitive performance in the classroom.

   **Interpretation**

   The results of this study suggest that increased physical exercise during the school day can improve cognitive performance in the classroom. However, further research is needed to confirm these findings and to determine the optimal amount and type of physical exercise that is most effective.
Nursery Schools

Record Details

Record Type: More
Scope Area: Schools for preschool children, usually 3 1/2 to 5 years of age. - nursery school programs are either part-time or part-week and may be operated as a service by public schools, or for profit by other agencies or individuals.

Category: Educational Levels, Degrees, and Organizations

Broader Terms: Shelves:

Narrower Terms: NV

Related Terms: Child Care Centers, Day Care Establishment, Early Childhood Education, Headstart Education

Use Term: NV

Add Date: 07/01/1988

Problems: 756

Both in Canada
Explode

A subject heading can consist of several subordinate terms. If you choose "explode" you also search for all the subordinate terms.
Search techniques

Two important techniques to remember

1. Truncation

Use truncation symbols to search for variant forms of words

- Protect*
  - protect, protects, protective, protection etc.
2. Boolean searching

- **cat AND dog**: Both words must be present in the document.
- **cat OR dog**: Either one (or both) of the words must be present in the document.
- **cat NOT dog**: You want to find documents which contain the first word, but NOT the second word.

### Documents

1. **Document 1**: black, purple, brown, orange
2. **Document 2**: black, blue, green, purple, yellow
3. **Document 3**: brown, yellow, blue, green, red
4. **Document 4**: pink, green, orange, blue, black
5. **Document 5**: red, purple, black, yellow
6. **Document 6**: red, orange, yellow, blue, brown
7. **Document 7**: yellow, brown, red, black, green
8. **Document 8**: green, purple, brown
1. Red AND blue?

2. Pink OR purple?
3. Green NOT black?

Methods search filter

- A given combination of text words, index terms and publication type – combined using AND with the subject search
- Limits the search to specific study designs (e.g. RCTs, qualitative studies, economic evaluations)
- Some are tested, some are not
- Cochrane Highly Sensitive Search Strategy
- Clinical Queries
- A collection of search filters: http://www.york.ac.uk/inst/crd/intertasc/filters.htm
What does a typical search filter look like?

1. randomized controlled trial.pt.
2. controlled clinical trial.pt.
3. randomized.ab.
4. placebo.ab.
5. clinical trials as topic.sh.
6. randomly.ab.
7. trial.ti.
8. 1 or 2 or 3 or 4 or 5 or 6 or 7
9. exp animals/ not humans.sh.
10. 8 not 9

Clinical Queries

http://hiru.mcmaster.ca/hiru/HIRU_Hedges_MEDLINE_Strategies.aspx

1. Caregivers/ 14095
2. limit 1 to "reviews (sensitivity)" 4585
3. limit 1 to "reviews (specificity)" 188
4. limit 1 to "reviews (optimized)" 1508
**Strategy - combining search terms**

1. Population 1
2. Population 2
3. Population 3
4. #1 OR #2 OR #3

5. Intervention 1
6. Intervention 2
7. Intervention 3
8. #5 OR #6 OR #7

9. Outcome 1
10. Outcome 2
11. Outcome 3
12. #9 OR #10 OR #11

13. #4 AND #8 AND #12

14. Methodology filter

15. #13 AND #14

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**Search log**

<table>
<thead>
<tr>
<th>Database</th>
<th>Dato</th>
<th>Strategi</th>
<th>Treff</th>
<th>Kommentar</th>
</tr>
</thead>
</table>

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### Reporting the search – search log

<table>
<thead>
<tr>
<th>Database</th>
<th>Date</th>
<th>Strategy</th>
<th>Hits</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cochrane</td>
<td>20.07.11</td>
<td>Search saved as: Social welfare 2011</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>PsycINFO</td>
<td>20.07.11</td>
<td>Search saved as:</td>
<td>233</td>
<td></td>
</tr>
<tr>
<td>MEDLINE</td>
<td>20.07.11</td>
<td>Search saved as: Social welfare_Medline_final</td>
<td>1014</td>
<td></td>
</tr>
<tr>
<td>RefMan</td>
<td>21.07.11</td>
<td>Duplicates not removed</td>
<td>1254</td>
<td></td>
</tr>
</tbody>
</table>

### 1. From question to strategy
Do the search strategies reflect the review question? (i.e. relevant parts of the PICO + relevant methods filter)?

### 2. Operators
Are operators (AND, OR, NOT) used correctly to combine the different search concepts (between or within P and I and C and O)?

### 3. Index terms
Have all relevant index terms been used and/or have irrelevant index terms been used?

### 4. Text words and truncation
Have all relevant text words, synonyms or text word variations been used/or have irrelevant terms been used? Has truncation been used correctly?

### 5. Spelling and syntax
Are there spelling errors, syntax errors or wrong line numbers?

### 6. Limits
Have unwarranted limitations been made, and/or have warranted limitations been omitted?

### 7. Adaptation
Have the search strategy been adapted to the databases that have been searched?

Evaluation (CCCE) management type, twenty-five care units were selected. All
the patients interviewed had been enrolled in the Arkansas IndependentChoice for at
least eight months at the time of the interview and received at least one hundred dollars
per month in the cash benefit. Care unit managers were interviewed in face-to-face, hour-long
interviews by a trained, experienced interviewer. Interviews were recorded with the help of
a qualitative data management and analysis software package.

The data collection process incorporated the perspectives of all three members of the care unit:
case worker, caregiver, and advocate. The CCE was the central focus of the interviews. Themes
include the family context of care, the meaning of independence, and the current context of care. In addition, participants spoke of topics such as the skills and qualities needed for a caregiver and the value of
IndependentChoice personal care services, alternatives uses of the cash benefit, previous
experiences with agency workers, and problems with IndependentChoice.