Creating search strategies for systematic reviews

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March, 2015
What is a systematic review?

A systematic review is a type of literature review that “identifies, appraises, and synthesizes research evidence from individual studies... they follow a strict protocol to ensure that as much of the relevant research base as possible has been considered and that the original studies are appraised and synthesized in a valid way. These methods minimize the risk of bias and are transparent, thus enabling replication”.

Centre for Reviews and Dissemination, University of York. *What is a systematic review and how is it different from a literature review?* [Online]. 2001; Available from: [http://www.york.ac.uk/inst/crd/faq1.htm](http://www.york.ac.uk/inst/crd/faq1.htm) [Note: URL no longer accessible]
What is a systematic review, cont.

“A systematic review is a literature review that is designed to locate, appraise and synthesize the best available evidence relating to a specific research question to provide informative and evidence-based answers.”

Boland, G; Cherry, M.G; Dickson, R., eds. Doing a systematic review: a student’s guide. London, Sage, 2014. p. 3
Why are systematic reviews important?

- Summaries of research evidence
- Unbiased
- Reproducible
How do I start?

• Frame the question
• Identify relevant literature
• Assess the quality of the literature
• Summarize the evidence
• Interpret the findings

We will concentrate on framing the question and planning the literature search.
How do you start your search?

• First, write down your research question
• Break it into separate concepts
• Find synonyms for the terms you want to search
• Use truncation and/or wildcards for alternate spellings
• Look for subject headings if the database uses a controlled vocabulary
• Do a search for each concept separately
• Combine the results of each concept
• Apply any limits or filters
“In order to identify as many relevant records as possible searches should comprise a combination of subject terms selected from the controlled vocabulary or thesaurus (‘exploded' where appropriate) with a wide range of free-text terms.”

What is a “controlled vocabulary”?

• List of subject headings for a specific database = controlled vocabulary
• In Medline they are called MeSH terms (MeSH = Medical Subject Heading)
• In EMBASE, they are called EMTREE terms
• CINAHL and PsycInfo also have their own subject headings
What about other databases?

Web of Knowledge and Scopus use keywords.

If you’re not sure what to use, check the database’s help section.
Identify the main concepts

• The easiest way to make your question searchable is to break it up into concepts

• For each concept, think of as many keywords/synonyms as you can

• A very popular method to use is PICO
PICO

• P = Person or population
• I = Intervention or treatment
• C = Comparator
• O = Outcome

• Sometimes “T” is added for Type of study or for the Timeframe involved
Another method is PIE (used more for qualitative research)
PIE

• P = Person or population or problem
• I = Intervention or treatment
• E = Effectiveness or evaluation of the intervention – how will it be measured?
Sample question
Does this fit into PICO or PIE?

• In middle-aged males, are PSA tests, compared to PET or CT scans, more accurate in diagnosing prostate cancer after prostate surgery?

  • (From OVID Support and Training slides: EBP PICOT research, 2015)
P: middle-aged males who have undergone prostate surgery
I: PSA test
C: PET or CT scans
O: diagnosis of prostate cancer
Sample question
Does this fit into PICO or PIE?

Are self-help groups effective for dealing with grief in adults who have lost their spouse in the last year?
P: RECENTLY BEREAVED WIDOWS AND WIDOWERS

I: SELF-HELP GROUPS OR SUPPORT GROUPS

E: EVALUATION OF SUPPORT GROUPS
Sample question
Does this fit into PICO or PIE?

For adolescents or young adults with ADHD, how does drug therapy compare with psychotherapy in affecting behaviour?

(From OVID Support and Training slides: EBP PICOT research, 2015)
P: adolescents with ADHD
I: drug therapy
C: psychotherapy
O: behaviour
If the topic of your review doesn’t fit into PICO or PIE, put each concept into a separate “concept box” and do a search for each concept.
Once you have decided on your search terms, choose databases appropriate for your topic. If you’re not sure which databases to use, check their information or “about” pages or ASK YOUR LIBRARIAN.
MEDLINE is the major medical database, published in the USA.

PubMed is often considered the free version of Medline, but actually contains some additional non-clinical citations, e.g., chemistry, geology.

EMBASE is similar to MEDLINE but covers more European and Far Eastern content.

PsycInfo indexes psychology.

CINAHL is the nursing and allied health database.

Scopus is an inter-disciplinary database, with good coverage of health and life sciences.
If you are looking for clinical trials, some good resources are:

https://clinicaltrials.gov/

and

http://www.who.int/ictrp/en/
These databases are all published by different publishers or organizations.

Your search strategy must be customized for each database.

Check their HELP pages for information

Or

ASK YOUR LIBRARIAN FOR HELP
Once you’ve done your search, apply any limits and/or filters
Limits and filters

• Searches often find hundreds (or thousands) of citations

• Use limits and/or filters to eliminate irrelevant citations

• You can narrow search results by type of study (most systematic reviews of interventions are based on RCTs)

• Can apply limits such as date of publication, language, age groups, etc.
Use pre-tested search filters to retrieve specific types of studies

Scottish Intercollegiate Guidelines Network: http://www.sign.ac.uk/methodology/filters.html

InterTASC Information Specialists’ Sub-Group Search Filter Resource: http://www.york.ac.uk/inst/crd/intertasc/index.htm

McMaster University. Health Information Research Unit: http://hiru.mcmaster.ca/hiru/HIRU_Hedges_home.aspx
PRACTICE

Research question:

What are the effects of cognitive rehabilitation on executive dysfunction for adult stroke patients?
P: ADULT STROKE PATIENTS WITH EXECUTIVE DYSFUNCTION

I: COGNITIVE REHABILITATION

C: - -

O: EFFECTS OF INTERVENTION
Has anyone already written a review on your topic?

Check Cochrane

or

PubMed Clinical Queries
Actually, there is a Cochrane review on this topic, but we’ll forge on anyway...

Cognitive rehabilitation for executive dysfunction in adults with stroke or other adult non-progressive acquired brain damage (Review)

Chung CSY, Pollock A, Campbell T, Durward BR, Hagen S

2013
Using “used for” synonyms in Medline and Embase to create a list of keywords

Medline:

cerebral stroke
strokes acute
cerebrovascular apoplexy
apoplexy
cerebrovascular accident acute
cerebrovascular accidents
brain vascular accidents
strokes cerebral
apoplexy cerebrovascular
stroke cerebral
stroke acute
cerebrovascular strokes
cvas (cerebrovascular accident)
brain vascular accident
cerebrovascular accident
acute strokes
acute cerebrovascular accidents
strokes
strokes cerebrovascular
vascular accident brain
cerebrovascular stroke
acute cerebrovascular accident
vascular accidents brain
stroke
cerebrovascular accidents acute
cva (cerebrovascular accident)
cerebral strokes
stroke cerebrovascular
acute stroke
accident, cerebrovascular
acute cerebrovascular lesion
acute focal cerebral vasculopathy
acute stroke
apoplectic stroke
apoplexia
apoplexy
blood flow disturbance, brain
brain accident
brain attack
brain blood flow disturbance
brain insult
brain insultus
brain ischemic attack
brain vascular accident
cerebral apoplexia
cerebral insult
cerebral stroke
cerebral vascular accident
cerebral vascular insufficiency
cerebrovascular accident
cerebrovascular arrest
cerebrovascular failure
cerebrovascular injury
cerebrovascular insufficiency
cerebrovascular insult
cerebrovascular trauma
cerebrum vascular accident
cryptogenic stroke
CVA
ischaemic seizure
ischemic cerebral attack
ischemic stroke
ischemic seizure
stroke
Keywords:

stroke* OR apoplex* OR cerebrovascular accident* OR brain vascular accident* OR cva* OR acute cerebrovascular lesion* OR acute focal cerebral vasculopathy OR brain accident* OR brain attack* OR brain blood flow disturbance* OR brain insult* OR brain ischaemic attack* OR brain ischemic attack* OR cerebral insult* OR cerebral vascular insufficiency OR cerebrovascular accident* OR cerebral vascular accident* OR cerebrovascular arrest OR cerebrovascular failure OR cerebrovascular injur* OR cerebrovascular insufficiency OR cerebrovascular insult* OR cerebrovascular trauma* OR cerebrum vascular accident* OR ischaemic seizure* OR ischemic seizure* OR ischaemic cerebral attack* OR ischemic cerebral attack* OR brain ischemia OR brain ischaemia
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<td>1 or 2 or 3</td>
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<td>Advanced</td>
<td>Display</td>
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Advanced Search | Basic Search | Find Citation | Search Tools | Search Fields | Multi-Field Search

2 Resources selected | Hide | Change

Ovid MEDLINE(R) 1946 to March Week 3 2015, Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations March 20, 2013

Enter keyword or phrase (* or $ for truncation) | Keyword | Author | Title | Journal | Search

Limits (close) | Include Multimedia | Map Term to Subject Heading
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<th>Search Type</th>
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<td>Display, Delete, Save, Auto-Alert, RSS Feed</td>
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<tr>
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<td>1 or 2 or 3</td>
<td>37,1944</td>
<td>Advanced</td>
<td>Display</td>
</tr>
</tbody>
</table>

Advanced Search | Basic Search | Find Citation | Search Tools | Search Fields | Multi-Field Search

1 Resource selected | Hide | Change

Search Engine: Embase Classic - Embase 1947 to 2015 Week 12

Enter keyword or phrase (* or $ for truncation) | Keyword | Author | Title | Journal

Search
Using Ovid medline
Database: Ovid MEDLINE(R) <1946 to March Week 3 2015>, Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations <March 20, 2015> Search Strategy:

1. exp Stroke/ (89850)
2. (stroke* or apoplex* or cerebrovascular accident* or brain vascular accident* or cva* or acute cerebrovascular lesion* or acute focal cerebral vasculopathy or brain accident* or brain attack* or brain blood flow disturbance* or brain insult* or brain ischaemic attack* or brain ischemic attack* or cerebral insult* or cerebral vascular insufficiency or cerebro vascular accident* or cerebral vascular accident* or cerebrovascular arrest or cerebrovascular failure or cerebrovascular injur* or cerebrovascular insufficiency or cerebrovascular insult* or cerebrovascular trauma* or cerebrum vascular accident* or ischaemic seizure* or ischemic seizure* or ischaemic cerebral attack* or ischemic cerebral attack* or brain ischemia or brain ischaemia).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier] (228380)
3. ((cerebrovascular or cerebral vascular) adj3 (accident* or insult*)).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier] (6597)
4. 1 or 2 or 3 (243786)
5. Executive Function/ (5841)
6. (executive control or executive dysfunction).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier] (3541)
7. 5 or 6 (8454)
8. Cognitive Therapy/ (16615)
9. cognitive rehabilitation.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier] (859)
10. 8 or 9 (17249)
11. 4 and 7 and 10 (6)
Using EMBASE
Database: Embase Classic+Embase <1947 to 2015 Week 12> Search Strategy:

1. exp cerebrovascular accident/ (102156)
2. (stroke* or apoplex* or cerebrovascular accident* or brain vascular accident* or cva* or acute cerebrovascular lesion* or acute focal cerebral vasculopathy or brain accident* or brain attack* or brain blood flow disturbance* or brain insult* or brain ischaemic attack* or brain ischemic attack* or cerebral insult* or cerebral vascular insufficiency or cerebrovascular accident* or brain vascular accident* or cerebral vascular accident* or cerebrovascular arrest or cerebrovascular failure or cerebrovascular injur* or cerebrovascular insufficiency or cerebrovascular insult* or cerebrovascular trauma* or cerebrum vascular accident* or ischaemic seizure* or ischemic seizure* or ischaemic cerebral attack* or ischemic cerebral attack* or brain ischemia or brain ischaemia).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword] (371853)
3. ((cerebrovascular or cerebral vascular) adj3 (accident* or insult*)).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword] (105442)
4. 1 or 2 or 3 (371944)
5. executive function/ (14500)
6. (executive control or executive dysfunction).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword] (5035)
7. 5 or 6 (17680)
8. cognitive rehabilitation/ (1457)
9. cognitive therapy/ (35850)
10. 8 or 9 (37123)
11. 4 and 7 and 10 (31)
Same search using PubMed
Using a database with keywords only:

SCOPUS
40 document results

Search within results... View secondary documents | Scholar footprint | Analyze search results

Refine
Limit | Exclude

Year
☐ 2015 (3)
☐ 2014 (5)
☐ 2013 (16)
☐ 2012 (4)
☐ 2011 (7)

Author Name
☐ Hagga, S. (2)
☐ Campbell, T. (2)
☐ Mausbaugh, S. (2)
☐ Oetzes, A. (2)
☐ Peddicley, A. (2)

Subject Area
☐ Medicine (33)
☐ Neuroscience (18)
☐ Psychology (6)
☐ Arts and Humanities (3)
☐ Health Professions (3)

Document Type
☐ Article (26)
☐ Review (16)
☐ Slides (2)
☐ Book Chapter (7)
☐ Conference Paper (1)

Source Title

Full Text

Effectiveness of an improvement-based individualized rehabilitation program using an iPad-based software platform

Deng Reicher, D.A., Fallahzadeh, I., Acevedo, E.M., Tripodo, V., Kiren, S.

2015 Frontiers in Human Neuroscience

Exercice training and recreational activities to promote executive functioning in chronic stroke: A proof-of-concept study

Lo-Ambrose, T., Eng, J.J.

2015 Journal of Stroke and Cerebrovascular Diseases

Clinical improvements in higher brain function and rapid functional recovery in a case of cerebral hemorrhage treated by neurocognitive rehabilitation

Kemuro, A., Narabayashi, H., Sasaki, Y., Ichinose, T., Hatoh, S., Maimoto, M.

2014 Neurocase

Clementi, F.

2014 American Family Physician

Cognitive control and its impact on recovery from aphasia stroke


2014 Brain

Pilot study: Computer-based virtual anatomical interactivity for rehabilitation of individuals with chronic acquired brain injury

Simmons, C.D., Arthanari, S., Meach, V.J.

2014 Journal of Rehabilitation Research and Development

Insights into Human Behavior from Lessons to the Prefrontal Cortex

Szczepanski, S.M., Knight, R.T.

2014 Neuron

Cognitive rehabilitation for executive dysfunction in adults with stroke or other adult non-progressive acquired brain damage

Chung, C.S., Pollock, A., Campbell, T., Diwakar, B.R., Hagen, S.

2013 The Cochrane database of systematic reviews

Using task-to-speech reading support for an adult with mild aphasia and cognitive impairment

Haines, J., Hux, K., Shiel, J.

2013 Communication Disorders Quarterly
Thank you