Systematic reviews: A practical approach

30 July 2020
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Our library (in normal times)

Recording available at
https://library.svhm.org.au/libraryhomepage/sy
stematic-reviews-introduction
My workplace now ....

My experience


and 18 in process ...
FAQs

Staff.
Students.
Time in lockdown.
Lots of research.
Lots of questions.

Key points
(with a little help from my friend)
What is a systematic review?

A systematic review attempts to collate all empirical evidence that fits pre-specified eligibility criteria to answer a specific research question. It uses explicit, systematic methods that are selected with a view to minimizing bias, thus providing reliable findings from which conclusions can be drawn and decisions made.

The key characteristics of a systematic review are:

- a clearly stated set of objectives with an explicit, reproducible methodology;
- a systematic search that attempts to identify all studies that would meet the eligibility criteria;
- an assessment of the validity of the findings of the included studies, for example through the assessment of risk of bias; and
- systematic presentation, and synthesis, of the characteristics and findings of the included studies.


In simple terms ...

- clear research question / clear objectives
- structured – follows a plan / protocol
- systematic methods – in search, screening, assessment, presentation
- comprehensive searches across multiple databases
- clear criteria for inclusion / exclusion of studies
- assesses validity / quality of results
- minimises bias eg risk of bias tools, more than one person involved
- and most importantly ....

REPRODUCIBLE!
Is it really a systematic review?

Refer to the PRISMA checklist – because publishers will.

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stematic-reviews-introduction
Webinar 30 July 2020 by Helen Wilding, Research Librarian, St Vincent’s Hospital Melbourne

The PRISMA Flow Diagram

Records identified through database searching (n = )
Additional records identified through other sources (n = )
Records after duplicates removed (n = )
Records screened (n = )
Records excluded (n = )
Full text articles assessed for eligibility (n = )
Full text articles excluded, with reasons (n = )
Studies included in qualitative synthesis (n = )
Studies included in qualitative synthesis (meta-analysis) (n = )
Studies included in quantitative synthesis (meta-analysis) (n = )
Records excluded (n = )
Full text articles excluded, with reasons (n = )
Studies included in quantitative synthesis (n = )
Studies included in qualitative synthesis (n = )


Before you start, work out where you are going ....

The question
Protocol (plan)
Records identified through database searching (n = )
Additional records identified through other sources (n = )
Records after duplicates removed (n = )
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Studies included in qualitative synthesis (meta-analysis) (n = )
Studies included in quantitative synthesis (meta-analysis) (n = )

The question

• needs to be new (or not recently reviewed)
• could be based on a specific format eg PICO
• could be broad or specific
• could be qualitative or quantitative – or both
• needs to be clearly defined
• needs to be manageable
• does not necessarily = the search strategy (especially if in PICO format)

The protocol

• recommended in PRISMA checklist
• sets out your plan step by step
• guidelines - http://prisma-statement.org/Protocols/
• usually registered with PROSPERO
• can take longer than you expect
• not essential BUT extremely helpful
Gather your tools

Endnote (bibliographic management software)

collect search results in one place
cite results
tidy up your duplicates

Availability:
• SVHM (staff)
• universities
• buy online

Recording available at
https://library.svhm.org.au/libraryhomepage/systematic-reviews-introduction
Covidence.org (cloud based systematic review software)

vote in/out (screening)  
assess quality  
extract data

Availability:
- SVHM library (staff)
- university libraries
- subscribe online

Start searching
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Studies included in quantitative synthesis (meta-analysis) (n = )

Records excluded (n = )

Full text articles excluded, with reasons (n = )

Records included in qualitative synthesis (n = )

Records included in quantitative synthesis (meta-analysis) (n = )

Which databases?
Can I search everything in one go?
Can I search full text?
How many results should I expect?
How do I keep track?


Hello!

Which databases do I search?

Art by Helen Wilding

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Medline ALL (Ovid) OR PubMed

- key database
- biomedical & clinical sciences
- Ovid Medline ALL = PubMed
  (no need to search both)
- American focus
- MeSH Terms

Should be the first database you search.
Do not move on to other databases until you have perfected your strategy here.

It is the Medline search strategy that will be included in your final paper.

Embase (Ovid)

- key database
- pharmacological & biomedical
- European focus
- EMTREE headings
- Includes Medline records but not a substitute

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PsycINFO (Ovid)
- key mental health database
- other subjects too
- PsycINFO terms

Cochrane Library (Wiley)
- key database
- Cochrane Database of Systematic Reviews (CDSR)
- Cochrane Central Register of Controlled Trials (CENTRAL)
- MeSH Terms
**Nursing @ Ovid**

- small nursing database
- messy records - do not export well
- EMTREE headings
- large overlap with CINAHL and Emcare
- not essential if using other nursing databases

**Austhealth (Informit)**

- small Australian database
- health & social sciences
- text searching only
- limited usefulness in most topics, but worth a look if you have access
Search smart ...
Save time ...

1. Ovid Medline
2. other Ovid databases
3. non Ovid databases
4. very small databases if appropriate

For example:

1. Medline (Ovid)
2. Embase (Ovid)
3. Emcare (Ovid)
4. PsycINFO (Ovid)
5. CINAHL (EBSCOhost)
6. Cochrane Library (Wiley)

And you might want to consider

- clinicaltrials.gov (registered trials, some incomplete) – interesting to be aware of and discuss, but are they relevant to your review topic and inclusion criteria?
- Austhealth (Informit) – tiny Australian database, few returns, but useful in some contexts, especially indigenous health
- Nursing @ Ovid – but seems to be covered by combination of Emcare, CINAHL and Medline

Recording available at https://library.svhm.org.au/libraryhomepage/systematic-reviews-introduction
Learn

literature searching
step by step

help sheets
videos
SVHM staff tutorials

Recording available at
https://library.svhm.org.au/libraryhomepage/literaturesearch
Osteoporosis/epilepsy/anti-epileptics literature review

Search strategy: Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations, Ovid MEDLINE(R) Daily, Ovid MEDLINE(R) and Ovid OLDMEDLINE(R) 1946 to Present

1 exp Epilepsy/
2 (epilepsy* or seizure*).tw.
3 1 or 2
4 exp Osteoporosis/ or exp Fractures, Bone/
5 (osteoporosis or fracture*).tw.
6 4 or 5
7 anticonvulsants/ or bromides/ or carbamazepine/ or chlorothiazide/ or clonazepam/ or ethosuximide/ or mephenytoin/ or mepobarbital/ or Midazolam/ or phenobarbital/ or phenytoin/ or primidone/ or valproic acid/ or vigabatrin/
8 (anticonvulsant* or anti convulsant* or antiepileptic* or anti epileptic*).tw.
9 (Acetazolamide or acetadiazol or Diamox or akzol or glauconox or humazolamide or huma zolamide or duramid or glauvax or edemox or acetazolam or dicarb or apacetazolamid or al zol or bromides or Carbamazone or neurotol or tegretol or epileps or carbapenic or finileps or amianze or Chlorothiazide or disterinurin or dithiazide or clobsam or frissiu or Clonazepam or antiepileptic or anticonvul
tw. or 5-4023 or ro S4023 or Ethosuximide or ethylmethylsuccinimide or pyreolepsin or emeside or ethylal or ethosuximida or ethosuxima or zaronin or suiley or suloxyl or ethosuclid or petridna or felbamate or felbantol or gabapentic or Neurontin or laosiumide or simport or lamotrigine or lamictal or levireacinum or keppra or Mephenytoin or 5 ethyl-3 methyl-5 phenylhydantoin or methyl phenothion or melfenoton or pheneton mexitol or meosantin or phenuanoin or methiton or Mepobarbital or methylphenobarbital or Promina or methylphenobarbigat in or mebaral or midosilom or tiosilum or ro 21-3981 or versed or dicom or ocarbazepine or trileptol or Phenobarbital or hysteps or phensyethbarbituric acid or gardenal or phena or phenobarbistone or acid phenylethylbarbituric or luminal or Phenytoin or antieps or spamin or diphynphydantoin or dipher or dihydan or epanistin or dilantin or hydantolt or diphenhydantoinate sodium or sodium diphenhydantoinate or feniton or Primidone or desoxyphenobarbital or primacine or tickantin or midazol or mycinol or sertan or remitul or primidon boltin or mylepsin or stripsentol or diaciret or suldiane or osoplot or taglabine or gafirin or tospiratam or Topax or Vigabatrin or gamma vinyl gamma amino butyric acid or acid gamma-vinyl-gamma-amino-butyric or gamma vinyl gaba or sablex or sabil or Valproic Acid or dipropyl acetate or valproate or epil or depakine or acid valproic or vugral or ergemyl or propylisopropylacetic acid or depakine or 3-propylpentanoic acid or acetate dipropyl or Depakote or acid propylisopropylacetic or sodium divalproex or convulsofin or divalproex sodium or 2 propylpentanoic acid or divalproex or zonisamide or zomegran.tw.
10 7 or 8 or 9
11 3 and 6 and 10
11 limit 11 to english language


Recording available at https://library.svhm.org.au/libraryhomepage/systematic-reviews-introduction

Webinar 30 July 2020 by Helen Wilding, Research Librarian, St Vincent's Hospital, Melbourne 7/08/2020
A good search strategy will:

- identify the exact database searched
- include subject headings appropriate to the database e.g. MeSH in Medline, EMTREE in Embase
- include textword searching – usually title and abstract
- clearly group concepts using Boolean logic (OR, AND)
- specify any limits used e.g. language, year range
- be easy to understand
- be adjusted appropriately for other databases
- BE REPLICABLE!!

You should always understand why you have, or have not, found a record.
Can I search all of the databases at the same time?

No. Each database uses a different language.

- Different subject headings - MeSH, Emtree etc
- Different syntax - egg.ti. vs TI egg vs egg:ti.

BUT you do not have to reinvent the wheel.
- Just translate your search into another database and check for appropriate headings.
- The THINKING will be the same.
- If you get the Medline search right, this won’t be hard.
- Use your Medline search as your ‘cheat sheet’.

Recording available at
https://library.svhm.org.au/libraryhomepage/sy
stematic-reviews-introduction
Polyglot – helps with translating search syntax

http://sr-accelerator.com/#/polyglot

**Why didn’t I find an article I know about?**

- does not fit your search criteria, eg broader concept, date range
- uses subject headings not included (consider adding)
- uses words or phrases not included (consider adding)
- ‘fluffy’ title which is impossible to find eg:
  - The sound of chains: a tragedy
  - A very peculiar practice
  - Does Oedipus never die?
- not in the database you are searching
- unpublished – grey literature

**TIP!** If you want to be a famous author, put the important words in your title so your article can be found!
What records do I keep?

From each database:
• full name of the database
• full search strategy, including limits
• date searched
• number of records retrieved

Then:
• total number of records from all databases
• number of results after duplicates removed

TIP! Keep records in a Word document as you go. It takes a few minutes at the time, but is priceless down the track.

TIP! Keep your project manageable!

• Consider your timeframe and resources
• Total number of results across all databases could double the Medline results alone.
• If you have a good Medline search, and retrieve 2000+ results in Medline alone, consider narrowing your question.
• Don’t compromise your search – better to refine your question.
• Don’t bite off more than you can chew!
Grey Literature

- literature that is not formally published eg government reports, trial registrations, conference proceedings, policies, issue papers, local guidelines, theses, newsletters etc.
- If using, add to “additional documents found”
- Hard to find, hard to contain
- Where do you stop?

Useful resource -
https://guides.library.uwa.edu.au/systematicreviews/greyliterature
Before searching for grey literature, consider:

- Is it relevant?
- Why do you need it?
- How will you assess quality?
- How will you use it if you find it?
- What is ‘it’?

For example, it may be worthwhile searching trials registries for incomplete trials so that you can explain why the review is needed. This might be background information rather than records that go through the formal review process.

What do I do with the records I retrieve?

- Export search results to Endnote as you go
- Medline first – usually best quality records
- Create groups in Endnote for each set ie Medline, Embase, reference lists etc. (Groups can be deleted after duplicates are removed)
- Record total number of records before removing duplicates
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- Full text articles excluded, with reasons (n = ***)
- Studies included in quantitative synthesis (meta-analysis) (n = ***)
- Records excluded (n = ***)
- Records identified through database searching (n = ***)

Tips on removing duplicates

- Add source and date to the Research Note field:
  - Select records in group > Tools > Change/Move/Copy Fields > Select a Field > Research Notes > Insert eg "Medline 10 02 20".
- Use Endnote to find duplicates BUT do not remove in bulk!
  - References > Find duplicates – then cancel cull process to leave list of duplicates
- Keep most complete record with abstract (usually Medline)
- May need to try multiple ways to locate duplicates eg sort by article title, journal, page numbers
- Some articles have the same title, but in different journals
- Record total number of records after duplicates removed

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systematic-reviews-introduction
### The PRISMA Flow Diagram

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- Studies included in quantitative synthesis (meta-analysis) (n = ***)

**Screening**
- First round of screening – on title and abstract only

Before screening for relevance, you have to know your **inclusion and exclusion criteria**.

- reduces risk of bias (screening all records the same way)
- part of your initial plan/protocol
- usually quite broad inclusion/exclusion criteria at this stage - getting rid of the obviously irrelevant.
- sometimes need to add extra criteria (refine criteria) as unanticipated questions arise
- criteria & process explained in your publication
- record number of records included / excluded

**Use Covidence if possible**
- SVHM staff can request access from library
- 2+ people screen to avoid bias

Common types of inclusion and exclusion criteria:

- type of illness / problem / intervention as appropriate
- age groups - children, adult, older adults
- language of publication – English only
- date range
- publication type eg excluding conference abstracts, letters, comments, editorials
- study type – RCT’s, qualitative studies

Example:

<table>
<thead>
<tr>
<th>Inclusion Criteria</th>
<th>Exclusion Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refers to Collaborative Assessment and Management of Suicidality (CAMS) OR Suicide Status Form AND controlled mirror design studies OR case control study OR randomised controlled trial OR controlled comparison trial AND a journal article</td>
<td>Does not refer to Collaborative Assessment and Management of Suicidality (CAMS) and/or Suicide Status Form OR Retrospective study OR Not in English language OR Did not test a hypothesis and provide results OR Unpublished at time of February 2018</td>
</tr>
</tbody>
</table>

Screening for relevance on title and abstract in Covidence
https://covidence.org

Screening for relevance on title and abstract in Endnote
(if you can’t access Covidence or similar software)

Add groups to sort results into In / Out / Unsure

Recording available at
https://library.svhm.org.au/libraryhomepage/systematic-reviews-introduction
Consider risk of bias

- How many people are voting/screening?
- Is screening done separately - not influenced by another reviewer?
- What happens if you are unsure if a record is relevant? Does a third person vote? Do 2 people discuss until consensus is reached? Do you put it through to the next round?

The PRISMA Flow Diagram

Screening for eligibility on full text

- Teams of 2 or more (to reduce risk of bias)
- Covidence recommended

Recording available at https://library.svhm.org.au/libraryhomepage/systematic-reviews-introduction
Second round of screening – using full text

- obtain full text and attach to citation in Endnote or upload to Covidence
- clarify/refine inclusion and exclusion criteria if necessary
- consider risk of bias as in previous round
- explain criteria & process in your publication
- record number of records included / excluded and reasons

Example:

**Inclusion criteria**
- Studies concerning IBD (including Crohn’s disease, ulcerative colitis, and indeterminate colitis) diagnosed using any well-established criteria;
- Studies examining quality of life;
- Studies with either adult or pediatric populations;
- Controlled studies, including randomized controlled trials (baseline data only), with prospective, retrospective, or cross-sectional designs;
- Peer-reviewed papers.

**Exclusion criteria**
- Studies focusing on other psychological variables such as depression, anxiety, distress, coping, or personality, without specific quality of life measures;
- Interventional studies (e.g., medication trials);
- Studies in languages other than English;
- Conference abstracts or any short papers with incomplete data presented;
- Incomplete data presented (e.g., QoL subscales only);
- Non-validated QoL scales;
- Case reports, case series, or qualitative research;
- Reviews or opinion papers;
- Animal studies.

Screening for eligibility on full text in Covidence
https://covidence.org

You will need to choose a reason from a drop down menu if excluding

Screening for eligibility on full text in Endnote
(if no access to Covidence or similar software)

Add groups to sort results into In / Out AND reason why
Assessing study quality /risk of bias tools

- Tools used will depend on the type of study being reviewed – RCT’s, prevalence, qualitative etc
- Choose appropriate tool to assess and compare remaining studies (usually only a handful)
- Try to use a known tool if possible, & reference it
- Can adjust tool if necessary, but must be described in detail. Needs to be justified.
guidelines/develop/assessing-risk-bias
Example: CASP Tool for assessing quality of Randomised Controlled Trials

Extracting data

- Type of data extracted depends on your question.
- Could be quantitative or qualitative.
- Needs to be described in your paper.
- Results usually set out in a table.
Example – description of data items extracted (method)

Table 2. Additional data items extracted from the top 30 studies.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific resource</td>
<td>Specific resource developed; for example, manual, mobile app, or website URL</td>
</tr>
<tr>
<td>Models and theory base</td>
<td>Defined structures and models within the project design and delivery, such as Stages of Change</td>
</tr>
<tr>
<td>Participatory frameworks</td>
<td>Defined frameworks involving end users in the development of resources, such as CoHerenRoadmap</td>
</tr>
<tr>
<td>Health service user (HSU) population</td>
<td>Defined as group of health professionals involved in the project, e.g., health care providers, hospital staff, community members</td>
</tr>
<tr>
<td>Health service provider (HSU)</td>
<td>Defined as groups or organizations involved in the development of the project, e.g., hospital, research group, advisory group</td>
</tr>
<tr>
<td>Methods</td>
<td>Methods or process and during the development of an electronic health resource, including both participatory and non-participatory methods (for example, workgroup formation and literature search)</td>
</tr>
<tr>
<td>CoHerenRoadmap stage</td>
<td>Methods sorted into different stages of a defined participatory framework known as the CoHerenRoadmap [35]. The 5 stages include: (1) Contextual Inquiry, (2) Value Specification, (3) Design, (4) Operationalization, and (5) Summative Evaluation.</td>
</tr>
<tr>
<td>Thematic findings (HSU’s perspective)</td>
<td>Reported findings based on the HSU’s perspective about the electronic health resource and development process</td>
</tr>
<tr>
<td>Authoritative recommendations</td>
<td>Reported results, limitations, and recommendations</td>
</tr>
</tbody>
</table>


Example – chart with details of data extracted (results)


Example of outcome data from:


<table>
<thead>
<tr>
<th>Outcome of interest</th>
<th>Study</th>
<th>Intervention results</th>
<th>Control results</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy intake male</td>
<td>Mean daily intake:</td>
<td>Mean daily intake:</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>(kcal/kj)</td>
<td>7002±1082 (kcal)</td>
<td>3920±974 (kcal)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>Mean daily intake:</td>
<td>Mean daily intake:</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>(kcal/kj)</td>
<td>6582±982 (kcal)</td>
<td>4570±876 (kcal)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linde, D. (2013)</td>
<td>Mean energy intake:</td>
<td>Mean energy intake:</td>
<td>0.09</td>
<td></td>
</tr>
<tr>
<td></td>
<td>93.0±6.2 kcal/kg</td>
<td>93.0±6.2 kcal/kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>McArdile, G. (2013)</td>
<td>Baseline intake:</td>
<td>Baseline intake:</td>
<td>0.01</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7568±982 (kcal)</td>
<td>7568±982 (kcal)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7568±982 (kcal)</td>
<td>7568±982 (kcal)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(a) Includes data extracted from published tables.
BMI, body mass index; EER, estimated energy requirement; EPR, estimated protein requirement; NR, not reported; NS, not significant; P < 0.05; PG-SGA, patient generated—subjective global assessment; QoL, quality of life.

Then finally, after all that searching, sifting, deduping, screening, culling, reading, sourcing, sorting, assessing, extracting, charting, comparing, analysing and sleepless nights …

DISCUSS

What did you find out?
What problems did you face?
Was there a risk of bias?
What do you recommend?
One last gentle reminder.....

When you are getting your paper published...

... put the important words and phrases in your title!

That way, the next person doing a systematic review will find yours 😊

Questions?