SYSTEMATIC REVIEWS: LAYING THE GROUNDWORK

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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 to minimize bias, thus providing reliable findings from which conclusions can be drawn and decisions made. Meta-analysis is the use of statistical methods to summarize and combine the results of independent studies."

- Cochrane Collaboration
A SYSTEMATIC REVIEW IS:

- Comprehensive
- Composed of a clear question
- Possessed of explicit and rigorous methods
- A research study
- Designed to limit bias
A SYSTEMATIC REVIEW IS NOT:

• A narrative or literature review
• A solo task
• A short-term research project
• A one-time commitment

A Systematic Review becomes a trusted piece of evidence, & should be kept current
SYSTEMATIC REVIEW = RESEARCH STUDY

Systematic Reviews : Primary Studies

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Primary Studies : Individual Participants

SRs are research studies and the subjects are primary studies, like RCTs.
Systematic Review = Research Study

- Literature searches provide the pool of studies
- Quality Systematic Reviews require quality studies

Give the same attention to the studies you include in a Systematic Review as you would to subjects in an experiment.
STEPS IN CONDUCTING A SYSTEMATIC REVIEW

• Assess need
• Assemble team
• Create protocol
• Conduct the review
• Update the review as needed
Assess need

Ask yourself these questions about your topic:

- Is the question interesting to practitioners or researchers?
- Are there existing Systematic Reviews?
- Are those reviews of quality?
- Are those reviews in need of an update?
ASSEMBLE TEAM

Required Skills and Expertise include:

• Methods
• Information Retrieval
• Subject Knowledge
  – Several reviewers
  – A tie-breaker
• Statistics
  – For Meta-Analysis
CREATE PROTOCOL

There are Protocols you can adapt and follow

- Cochrane Collaboration
- Campbell Collaboration
- PROSPERO
- PRISMA-P guidelines

A PROTOCOL is the plan or set of steps to follow, and includes:
- Rationale
- Objectives
- Methods
(1) The Research Question

**PICO(TS)**
- **Patient/population**
- **Intervention (or exposure)**
- **Comparison**
- **Outcome**
- **Timing**
- **Study Design**
PARTS OF THE PROTOCOL

(2) The Inclusion/Exclusion Criteria

• Study Types
• Scope
• Languages
• Publication Types
PARTS OF THE PROTOCOL

(3) Search Strategy

• Databases
• Search terms
• Limits
• Updates
• Citation Management plan & tools

Cochrane Reviews mandate Medline, EMBASE, & the Cochrane Library (but you’ll probably need other databases, grey lit., & handsearching, too)
SEARCH STRATEGY?

DON’T PANIC

(The Library can help with that)
SEARCH STRATEGY

Search strategy

Ovid MEDLINE(R)
# Searches Results
1 exp osteoporosis/ or osteopenia/ 24956
2 exp fractures, bone/ 48639
3 1 and 2 7521
4 ././ yr=2008-2010 and hu=y 1408
5 bone density conservation agents/ or calcium/ or selective estrogen receptor modulators/ or vitamin d/ 93798
6 4 and 5 443
7 (alendronate or etidronate/).mp. or ibandronate/.mp. or pamidronate.mp. or resorcinol.mp. or zoledronate.mp. or bisphosphonates.mp. or disphosphonates.mp. or calcitonin.mp. [mp=title, original title, abstract, name of substance word, subject heading word, unique identifier] 16982
8 (raloxifene or tamoxifene or teriparatide or denosumab) mp. [mp=title, original title, abstract, name of substance word, subject heading word, unique identifier] 12189
9 4 and (7 or 8) 251
10 6 or 9 490
11 10 and placebo* mp. [mp=title, original title, abstract, name of substance word, subject heading word, unique identifier] 56
12 10 and systematic*.mp. [mp=title, original title, abstract, name of substance word, subject heading word, unique identifier] 10
13 10 and comparative study/ 21
14 randomized controlled trial/.pt. 185925
15 controlled clinical trial.pt. 34713
16 randomized controlled trials/ 56507
17 random allocation.sh. 32003
18 double blind method.sh. 59430
19 single-blind method.sh. 10945
20 clinical trial$.pt. 262666
21 exp clinical trials/ 0
22 (clinic$ or adj25 trial$)ti,ab. 125979
23 (sing$ or doub$ or treb$ or tripl$) adj (blind$ or mask$),ti,ab. 56901
24 placebos.sh. or placebo$.ti,ab. 77056
25 random$ ti,ab. 338239
26 research design.sh. 36764
27 exp evaluation studies/ 128329
28 follow up studies.sh. 229076
29 prospective studies.sh. 194109
(4) The Study Selection

- Review for:
  - Applicability
  - Bias
    - Based on Title and Abstract usually
- Need at least two independent reviewers and a tie-breaker
- Document everything
  - Include log of excluded studies and why
PARTS OF THE PROTOCOL

(5) Data Extraction

- For included studies
  - What data?
  - What software?
  - Procedures?
  - Author contacts
  - Language translation?

- You read the whole article @ this point

http://chmg.cochrane.org/sites/chmg.cochrane.org/files/uploads/Template-Data%20Extraction-CHMG.pdf
(6) Quality Assessment

- Define criteria
- Define your process
- Will it effect your analysis?
(7) Data Synthesis

- Are you including Meta-analysis?
  - Qualitative or Quantitative?
- What are the outcomes of interest?
  - Are outcomes comparable between studies?
- Publication bias?

If you’re doing a Meta-Analysis, you should include a statistician or similar expert on your team from Day One.
Parts of the Protocol

(8) Dissemination

- What is your publication plan?
- Where would you like to publish?
- Do you need approval from a funder or board?
CONDUCT THE REVIEW

Just Follow Your Protocol!

• Test your protocol with a small set of studies
• Review and analyze literature as dictated
• Problems? STOP and revise as needed

Stay in touch with the Librarian in case you need to make revisions.

DOCUMENT ANY CHANGES AND WHY YOU MADE THEM
Update the review

• New research findings can render a Systematic Review obsolete.
• Cochrane recommends Reviews be updated every 2 years or include commentary explaining why not.
• Updates can be simply re-running searches or may involve restructuring research questions
Why does it matter?
The average systematic review requires at least 12 months of work.

**Box 2.3.b: Timeline for a Cochrane Review**

<table>
<thead>
<tr>
<th>Month</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 2</td>
<td>Preparation of protocol</td>
</tr>
<tr>
<td>3 - 8</td>
<td>Searches for published and unpublished studies</td>
</tr>
<tr>
<td>2 - 3</td>
<td>Pilot test of eligibility criteria</td>
</tr>
<tr>
<td>3 - 8</td>
<td>Inclusion assessments</td>
</tr>
<tr>
<td>3</td>
<td>Pilot test of 'Risk of bias' assessment</td>
</tr>
<tr>
<td>3 - 10</td>
<td>Validity assessments</td>
</tr>
<tr>
<td>3</td>
<td>Pilot test of data collection</td>
</tr>
<tr>
<td>3 - 10</td>
<td>Data collection</td>
</tr>
<tr>
<td>3 - 10</td>
<td>Data entry</td>
</tr>
<tr>
<td>5 - 11</td>
<td>Follow up of missing information</td>
</tr>
<tr>
<td>8 - 10</td>
<td>Analysis</td>
</tr>
<tr>
<td>1 - 11</td>
<td>Preparation of review report</td>
</tr>
<tr>
<td>12 -</td>
<td>Keeping the review up-to-date</td>
</tr>
</tbody>
</table>

Reviews of increasing complexity, from narrative reviews to systematic reviews... with complexity comes *an increase in time & resources needed*.

HLWIKI International

[http://hlwiki.slais.ubc.ca/index.php/Scoping_reviews](http://hlwiki.slais.ubc.ca/index.php/Scoping_reviews)
**Other Types of Reviews**

- **Narrative Review**
  - Focused on an overview of a topic, may contain opinion

- **Scoping Review**
  - Like a Narrative Review, but also searches for gaps in the research literature

- **Rapid Review**
  - Similar to an accelerated Systematic Review, targeted toward filling urgent needs in health care

- **Horizon Scan**
  - Scopes out areas for further research and study
Start with our LibGuide:
http://researchguides.library.tufts.edu/SystematicReviews?hs=a

Seek expert advice here:
• Cochrane Handbook of Systematic Reviews of Interventions: http://handbook.cochrane.org/
• PRISMA: http://www.prisma-statement.org/
RESOURCES

One of your FIRST steps in conducting a Systematic Review should be to contact a Librarian to work with you and your team!

Email: hhsl@tufts.edu
Call: 617-636-6705
Text: 617-477-8439
Chat: http://www.library.tufts.edu/hsl/services/ask.html
THANK YOU FOR YOUR ATTENTION!

Do you have any questions?

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