Exploring the steps of systematic and scoping reviews using Covidence

Dalhousie University is located in Mi’kma’ki, the ancestral and unceded territory of the Mi’kmaq. We are all Treaty people.

Topics to be introduced

• Steps of a research review
• Walkthrough of tool (interactive)
  • Getting started
  • Review Settings: review team, research question, inclusion criteria (aka protocol)
  • Importing from databases
  • Screening
  • Extraction
  • Export
• Where to get help
Streamlining reviews

The mission of Covidence is to improve the use of evidence in health by improving the efficiency and experience of systematic review production.
By the end of this workshop…

- Identify the steps of a systematic or scoping review and how Covidence supports each
- Understand how to navigate Covidence
- Feel comfortable starting a review in Covidence
- Know how to access support tools
What we ARE NOT covering today:

- Statistics – how to do a meta-analysis
- In-depth training for creating comprehensive search strategies
- Basics covered in the earlier Literature Review sessions in the Bootcamp series
- ALL of the content on these slides! They are for your reference, but we won’t have time for all the details included here.
What is a systematic review?

"A systematic review aims to comprehensively locate and synthesize research that bears on a particular question, using organized, transparent, and replicable procedures at each step in the process."

(Littell, Corcoran, & Pillai 2008) [1]

http://dal.ca.libguides.com/systematicreviews

May 28, 2019 Robin Parker
SRs with Covidence
Instructional resources for conducting systematic reviews:

**Cochrane Training** Learn how to conduct, edit, and read systematic reviews from various training resources. Some restricted to Cochrane Authors.

**Joanna Briggs Institute** Includes information on short courses, online courses. Fees apply.

**John Hopkins MOOC** Free MOOC offered with flexible deadlines and start times.
## Types of Literature Reviews

<table>
<thead>
<tr>
<th></th>
<th>Conventional</th>
<th>Systematic</th>
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<tbody>
<tr>
<td><strong>Question</strong></td>
<td>Often broad in scope</td>
<td>Often a focused clinical question</td>
</tr>
<tr>
<td><strong>Sources &amp; Searches</strong></td>
<td>Not usually specified Potentially biased</td>
<td>Comprehensive source and strategy explicitly stated</td>
</tr>
<tr>
<td><strong>Selection</strong></td>
<td>Not usually specified Potentially biased</td>
<td>Criterion-based uniformly applied</td>
</tr>
<tr>
<td><strong>Appraisal</strong></td>
<td>Variable</td>
<td>Rigorous critical appraisal</td>
</tr>
<tr>
<td><strong>Synthesis</strong></td>
<td>Qualitative summary common</td>
<td>Qualitative summary +/- Meta Analysis</td>
</tr>
<tr>
<td><strong>Inferences</strong></td>
<td>Sometimes evidence-based</td>
<td>Evidence-based</td>
</tr>
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</table>
Most Research Reviews

Pre-defined, explicit methods:
– Clearly formulated research question
– Comprehensive search to identify studies
– Selection criteria for inclusion
– Data collection & critical appraisal
– Synthesis & reporting

Minimize potential biases at each step – or discuss limitations and context in which conclusions apply
Advantages of Systematic Reviews

• Reduced likelihood of being misled
• Increased confidence about expected outcomes
• Decision-makers can focus on local applicability
• Allows stakeholders to constructively contest research evidence
Steps to a systematic (or scoping) review:

a) Developing the protocol
b) Defining the review question
c) Literature searching
d) Study selection
e) Risk of bias assessment
f) Data collection
g) Analysis & Reporting
Getting started

- Accept invitation to the Bootcamp review
- Create a new review (optional)
- Invite two team-mates to review (opt)
- Accept invitations (optional)
Steps to a systematic review:

a) Developing the protocol
b) Defining the review question
c) Literature searching
d) Study selection
e) Risk of bias assessment
f) Data collection
g) Analysis & Reporting
Prospective Register of Systematic Reviews: PROSPERO

CRD is pleased to announce that PROSPERO now contains over 1000 registrations. The 1000th record is for a systematic review of the accuracy of first trimester ultrasound in the diagnosis of ectopic pregnancy. The review is being undertaken by clinical researchers at the University of Nottingham in the UK and can be found at [www.crd.york.ac.uk/PROSPERO](http://www.crd.york.ac.uk/PROSPERO)

http://www.crd.york.ac.uk/PROSPERO/
Reporting Guidelines

• PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analyses checklist
• PRISMA extension of Scoping Reviews (PRISMA - ScR)
• Equator Network (Reporting and transparency)
Example Timeline - Systematic Review

- **Protocol**: 3-6 months
- **Search**: 1-2 months
- **Study Selection**: 2-3 months
- **Risk of bias assessment**: 3-4 months
- **Data extraction**: 1-2 months
- **Analysis and reporting**: 2-3 months

1-2 years
Settings – operationalizing the Protocol

- Build your team (add reviewers)
- Review settings
  - Capture your search strategies & review question
  - Changing from Single to Dual reviewer
- Manage rules (team settings)
- Adding keywords for highlight
- Manage inclusion and exclusion criteria
Importance of the Review Question

- Transparency
- Minimizes bias
- Facilitates subsequent steps:
  - Search strategy
  - Selection of studies
  - Planning the analysis
  - Reporting of results
Examples of review questions – beware!

Example – What antibiotic is best for treating UTIs?

Challenges – not specific regarding intervention, comparison, and key outcomes

Solutions – compare two specific drugs, or one compared to several (or no treatment); specify severity of condition and outcomes of interest (eg. presence of bacteria in culture, reduced duration of symptoms, recurrence)
Do prophylactic antibiotics help prevent recurrent UTIs in healthy, non-pregnant women?

Example review objectives:

The purpose of this review is to identify systematic reviews by Dalhousie authors and assess the degree of adherence to methodological and reporting guidelines using AMSTAR 2 and PRISMA, respectively.
Topics to be Introduced

Steps to a systematic review:

a) Developing the protocol
b) Defining the review question

c) Literature searching

d) Study selection
e) Risk of bias assessment
f) Data collection
g) Analysis & Reporting
Phases of the Comprehensive Literature Search

Identify existing systematic reviews
  – E.g. the Cochrane Library; Experts

Scoping search
  – Initial search on small range of databases

Comprehensive, systematic search
  – Full search; multiple sources

Update the search during the review process

Watch Yale video tutorials:
http://library.medicine.yale.edu/tutorials/subjects/systematic-reviews
Sources for Locating Studies

Electronic bibliographic databases (e.g. Medline, EMBASE, CINAHL, Cochrane Library)

Specialized registers of trials (CENTRAL, Cochrane review group registries)

Hand-searching relevant journals

Reference lists
  – Other reviews
  – Included studies

Grey literature
  – Pharmaceutical companies
  – Internet

Personal communication
  – suggestions from experts
  – contacting study authors
Q: Why do I have to use more than one database? Isn't it all in PubMed/Medline?

A: No, it is not all in PubMed/Medline.


From: http://beckerguides.wustl.edu/c.php?g=299565&p=2000712
Developing the Database Search Strategy

- Get help from a librarian
- Review question components: PICO
- Subject headings and free text:
  - Exemplar articles & reviews
  - Cochrane Review Groups
- Boolean operators (AND, OR, NOT)
- Study design filters
Meet with a librarian to help develop and refine your search strategies!

The librarian can also serve as a peer-reviewer to confirm that there are no errors or oversights in your final search strategies.
Search strategy translated to multiple databases

<table>
<thead>
<tr>
<th>Table 1. Search strategies</th>
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<tbody>
<tr>
<td><strong>MEDLINE (OVID) and Central (OVID)</strong></td>
</tr>
<tr>
<td>1. Acupuncture/ or acupuncture.mp.</td>
</tr>
<tr>
<td>2. electroacupuncture/ or electroacupuncture.mp. [mp=title, original title, abstract, name of substance word, subject heading word]</td>
</tr>
<tr>
<td>3. moxibustion.mp. [mp=title, original title, abstract, name of substance word, subject heading word]</td>
</tr>
<tr>
<td>4. medicine, oriental traditional/ or medicine, chinese traditional/</td>
</tr>
<tr>
<td>5. Oriental Traditional Medicine.mp. [mp=title, original title, abstract, name of substance word, subject heading word]</td>
</tr>
<tr>
<td>6. Chinese traditional medicine.mp. [mp=title, original title, abstract, name of substance word, subject heading word]</td>
</tr>
<tr>
<td>7. arthritis.mp. [mp=title, original title, abstract, name of substance word, subject heading word]</td>
</tr>
<tr>
<td>8. arthritis/ or exp osteoarthritis/</td>
</tr>
<tr>
<td>9. osteoarthritis.mp. [mp=title, original title, abstract, name of substance word, subject heading word]</td>
</tr>
<tr>
<td>10. joint diseases or arthralgia or joint pain or chronic joint symptoms or gonarthrosis or osteoarthritis or ostearthrosis or degenerative arthritis.mp. [mp=title, original title, abstract, name of substance word, subject heading word]</td>
</tr>
<tr>
<td>11. or/1-8</td>
</tr>
<tr>
<td>12. arthritis.mp. [mp=title, original title, abstract, name of substance word, subject heading word]</td>
</tr>
<tr>
<td>13. arthritis/ or exp osteoarthritis/</td>
</tr>
<tr>
<td>14. osteoarthritis.mp. [mp=title, original title, abstract, name of substance word, subject heading word]</td>
</tr>
<tr>
<td>15. randomized.ab.</td>
</tr>
<tr>
<td>16. placebo_ab.</td>
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</tbody>
</table>

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<tr>
<th><strong>EMBASE (OVID)</strong></th>
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</thead>
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<tr>
<td>1. exp ACUPUNCTURE/ or acupuncture.mp.</td>
</tr>
<tr>
<td>2. moxibustion.mp.</td>
</tr>
<tr>
<td>3. traditional medicine.mp. or exp Traditional Medicine/</td>
</tr>
<tr>
<td>4. 1 or 2 or 3 or 4 or 5 or 6</td>
</tr>
<tr>
<td>5. arthritis.mp. [mp=title, original title, abstract, name of substance word, subject heading word]</td>
</tr>
<tr>
<td>6. arthritis/ or exp osteoarthritis/</td>
</tr>
<tr>
<td>7. osteoarthritis.mp. [mp=title, original title, abstract, name of substance word, subject heading word]</td>
</tr>
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<td>8. joint diseases or arthralgia or joint pain or chronic joint symptoms or gonarthrosis or osteoarthritis or ostearthrosis or degenerative arthritis.mp. [mp=title, original title, abstract, name of substance word, subject heading word]</td>
</tr>
<tr>
<td>9. or/8-11</td>
</tr>
<tr>
<td>10. exp clinical trial/</td>
</tr>
<tr>
<td>11. exp randomized controlled trial/</td>
</tr>
<tr>
<td>12. randomized.ab.</td>
</tr>
<tr>
<td>13. placebo_ab.</td>
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SRs with Covidence
Final Search Strategy

Complete & finalized at the protocol stage

Describe in detail:

– Allow replication
– Facilitate update -> save searches and set alerts!

Document throughout the search process:

– Sources
– Strategies
– Time periods
– Any restrictions
Searches done in all databases?
Next steps…

- Export to citation management software (RefWorks, EndNote, Mendeley, etc.) AND/OR systematic review management software (Covidence, DistillerSR, Rayyan, etc.)
- Identify and Remove duplicate citations
- If using RefWorks etc., need to export for screening to Excel, Covidence, etc.
Deduplication options:

- Covidence: imperfect, but automatic
- **RefWorks**: improved performance, but needs to be checked manually – time consuming
- EndNote: best accuracy, especially using published method\(^1\), but EndNote is costly
- Other citation management software

Test searches to export (limit to last 2 years)


**Embase** (export to RIS format): ('disease model*':ti,ab OR 'medical model*':ti,ab OR 'biomedical model*':ti,ab OR 'biological model*':ti,ab OR 'biological model':exp) AND ('eating disorder':exp OR anorexia*:ti,ab OR bulimia*:ti,ab OR 'eating disorder*':ti,ab OR 'disordered eating':ti,ab)
Study Selection Criteria

Decisions about study inclusion/exclusion:
  – Based on design
  – NOT results

Standardized process (decision rules)
  – Transparent
  – Guide decisions
  – Produce consistent results

Operationalize PICO *a priori*

Studies (not reports) are unit of interest
Study Selection Process

Separate step from collecting data

Pilot test selection criteria

Phases of selection:
- Initial screen (Title & Abstract)
- Detailed screen (Full text)

Two reviewers with consensus
- Each reviewer: Yes, No, Maybe
- Include notes & comments

Track excluded articles & reasons (full text level)

Consider using Systematic Review Management Software such as Covidence!!
Study Selection: Additional issues

Uncertain inclusion (after full review)
   Information from other publications of the same study
   Contact the study author

Non-English language publications
   Risk of bias if excluded (some topic areas)
   Capture in the search
   Translation assistance
Steps to a systematic review:

a) Developing the protocol
b) Defining the review question
c) Literature searching
d) Study selection
e) Risk of bias assessment
f) Data collection
g) Analysis & Reporting
Risk of Bias Assessment

Component of ‘Quality Assessment’

Internal validity of included studies

Assessment of key potential biases

Validity of included studies will influence:

– Analysis & results

– Interpretation
What is bias?
• Systematic error or deviation from the truth in results or inferences
• Can operate in either direction:
  – Underestimation
  – Overestimation of true treatment effect
• Results of the review could be misleading if risk of bias is not considered
• Empirical evidence:
  – Flaws in design, conduct, analysis lead to bias
Incorporating Risk of Bias Assessments

• Not appropriate to ignore potential biases
• Explore the impact of individual bias domains
• Include in analyses
  – Primary analysis restricted to studies with low Risk of Bias
    • Sensitivity analyses may include higher risk studies
Extraction – Quality Assessment / Risk of Bias – Demo Tougas

• Choice of format: Cochrane RoB or Custom template
• Adding, deleting, and editing domains
  • How to enable outcome level risk of bias
• Making a judgement
• Annotations from text
• Completing Consensus

Not very good for study types other than intervention studies (not recommended for scoping reviews)
Risk of Bias/Quality Assessment Tools

- Cochrane Risk of Bias 2
- MMAT
- ROBINS-I
- ...

http://dal.ca.libguides.com/systematicreviews/appraisal
Data collection

A priori determine:
– ‘Who’ (two people, independent), and
– ‘How’ (process) to minimize bias

Data extraction form:
– Paper or electronic (e.g., Covidence, Excel)
– Develop information and instructions
– Pilot test

Study characteristics:
– PICO information
– Potential sources of heterogeneity
Data Extraction– Demo Tougas

- Identification information is mostly fill-in-the-blank
- Study arms are interventions of interest
- Customisable tables:
  - Baseline characteristics
  - Intervention characteristics
  - Outcomes: (Dichotomous, Continuous, Adverse events)

Not very good for study types other than intervention studies (not recommended for scoping reviews)
Overview of Analysis

• Different analytical methods:
  – Qualitative synthesis
  – Meta-analysis
  – Meta-regression

• Strengths & limitations with each

• Methods should be pre-specified and justified
Quantitative Synthesis

Systematic Review ≠ Meta-analysis

*Systematic reviews*: use well-defined protocol and methodological principles to attempt to reduce bias

– Can be qualitative or quantitative

*Meta-analysis*: statistical analysis of a collection of independent studies

– Quantitative part of *SOME* systematic reviews
Why perform a Meta-analysis?

Synthesis: Estimate overall measure of treatment effect
- Combine data from primary studies
- Improve precision of estimate of treatment effect
- Improve statistical power

Exploratory: Assess between-study differences
- Exploring heterogeneity
- Assess sensitivity to study characteristics
- Generate new hypotheses
When is Meta-analysis NOT appropriate?

• If studies are clinically diverse
  – Results may be meaningless
  – Genuine differences may be obscured

• Not appropriate to pool if important differences:
  – Population
  – Intervention
  – Comparisons
  – Outcomes

• Presence of serious publication or reporting biases
Guidance on qualitative synthesis

Follow guidance appropriate to your discipline for descriptive/qualitative synthesis (e.g. Joanna Briggs Guidance for Scoping review or Qualitative reviews)

See: http://dal.ca.libguides.com/systematicreviews/standards
Reporting Guidelines

- **PRISMA**: Preferred Reporting Items for Systematic Reviews and Meta-Analyses checklist
- **PRISMA extension of Scoping Reviews (PRISMA-ScR)**
- Equator Network (Reporting and transparency)
Exporting

• PRISMA numbers > http://prisma.thetacollaborative.ca/

• To Excel:
  • QA: from the included studies page
  • DE: from the export tool, select included then check box

• To RevMan: from export tool
  • RevMan file must be locally on your computer

• Reference lists: from export tool
Reporting Results

Tables and figures

Forest plots to illustrate results of individual studies and meta-analyses (Review Manager software – free download)

Discussion in context

– Benefits & harms
– Completeness and applicability of evidence
– Quality of the evidence

Implications for practice & for research

Use PRISMA checklist to guide in reporting:
http://www.prisma-statement.org/
Where to go for more assistance

Systematic literature searching and overview of evidence synthesis process and tools:

– Health Librarians at Dalhousie’s W. K. Kellogg Health Sciences Library (students and faculty)

– [http://dal.ca.libguides.com/systematicreviews](http://dal.ca.libguides.com/systematicreviews)
More assistance, cont’d
Statistics/meta-analyses:

– RMU/Faculty of Medicine Biostatistics Consultants: [http://www.cdha.nshealth.ca/discovery-innovation/research-centres-and-facilities/research-methods-unit](http://www.cdha.nshealth.ca/discovery-innovation/research-centres-and-facilities/research-methods-unit)

– Statistics experts in your faculty

– RevMan software

– Statistics software through Dalhousie: SPSS
Covidence Support

• Knowledge Base: http://support.covidence.org/help_center
• Support email: support@covidence.org
• YouTube channel: Covidence
• Twitter: @Covidence

http://dal.ca.libguides.com/systematicreviews/covidence
References


Slide acknowledgements: some content was pulled from a Covidence webinar slide deck
Questions?

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Thank you!