STEPS FOR CONDUCTING A SYSTEMATIC REVIEW

Fall 2014
Systematic Review Process

1. Identify the issue and determine the question
2. Write a plan for the review (protocol)
3. Search for studies
4. Sift and select studies
5. Extract data from the studies
6. Assess the quality of the studies
7. Combine the data (synthesis or meta-analysis)
8. Discuss and conclude overall findings

Centre for Health Communication and Participation
http://navigatingeffectivetreatments.org.au/exploring_systematic_reviews.html
Pyramid of Evidence

Systematic Reviews, Meta-Analyses

Randomized Controlled Double Blind Studies

Quasi-Experimental

Prospective Cohort Studies

Case-Controlled Studies

Case Reports, Case Series

Ideas, Editorials, Opinions

Animal Research

In Vitro Research
Systematic Review Definition

- This methodology prescribes **explicit, reproducible, and transparent processes** for collating the best available evidence in answer to specific questions.

- In particular, it requires the use of **robust techniques** for:
  - developing the research question
  - searching for and identifying primary studies,
  - selecting the studies to be included in the review,
  - extracting the data from the studies, and
  - appraising the quality of these studies,
  - synthesizing the findings narratively and/or through pooling suitable quantitative data in meta-analysis

## Systematic Reviews / Traditional Reviews

<table>
<thead>
<tr>
<th>Feature</th>
<th>Systematic Review</th>
<th>Narrative / Traditional Reviews</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Question</strong></td>
<td>Often focused (clinical) question.</td>
<td>Sometimes broad in scope.</td>
</tr>
<tr>
<td><strong>Sources &amp; Search</strong></td>
<td>Explicit search strategy of multiple databases. Comprehensive sources.</td>
<td>Not usually specified.</td>
</tr>
<tr>
<td><strong>Selection</strong></td>
<td>Criterion-based selection; uniformly applied</td>
<td>Not usually specified.</td>
</tr>
<tr>
<td><strong>Appraisal</strong></td>
<td>Rigorous critical appraisal.</td>
<td>Variable.</td>
</tr>
<tr>
<td><strong>Synthesis</strong></td>
<td>Quantitative summary. Also qualitative/narrative.</td>
<td>Often qualitative summary.</td>
</tr>
<tr>
<td><strong>Inferences</strong></td>
<td>Based on all available evidence.</td>
<td>Based on a sample of the evidence.</td>
</tr>
<tr>
<td><strong>Grading</strong></td>
<td>All evidence is graded (quality)</td>
<td>May or may not be graded.</td>
</tr>
</tbody>
</table>

Systematic Review Myths

Systematic reviews:

- are the same as ordinary literature reviews, only bigger
- include only randomized controlled trials
- require the adoption of a biomedical model of health
- must involve statistical analysis / synthesis
- must be conducted by experts
- can be done without experienced librarian support
- are not really research

Reducing Bias

Systematic reviews attempt to **minimize bias and error** throughout the review process

- Uses systematic process that is transparent and replicable
- Document transparent / replicable search strategies
- Inter-rater reliability on key data
- Assessment of bias in studies
- Assessment of study quality
- Meta-analysis (when possible) to statistically synthesize results across studies
<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 “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>
Stages of Systematic Review Process

1. Problem Formulation
2. Data Collection
3. Data Evaluation
4. Data Analysis
5. Reporting Findings

Nomenclature from: Campbell Collaboration
Stage 1: Problem Formulation
Problem Formulation

- Developing your protocol (research plan)
  - Developing research questions
  - Developing inclusion / exclusion criteria
  - Developing a coding system for data extraction
  - Determining data management
Developing a research question for a systematic review requires an understanding of the existing literature, including gaps and uncertainties, definitions, and terminologies.
Research Questions

- Questions often use the PICO(S) framework:
  - Population/Participants
  - Interventions
  - Comparisons
  - Outcomes
  - Study design

- “To assess the effects of [intervention] compared to [comparison/control] for [condition/problem] in [population] in [context] on [outcomes].”
In post-cardiac arrest patients with return of spontaneous circulation (P), does therapeutic hypothermia (I) compared with usual care (C), improve morbidity or mortality (O)?
Study eligibility criteria:
- Clearly defines which subjects or studies will be included in the review
  - Essential for determining relevant and irrelevant studies
- Determined by the research question
- MUST be defined before data collection (i.e. conducting the search)
Inclusion / Exclusion Criteria

Criteria to consider:

Population/ Participants:
- Age / grade level
- Gender, ethnicity, socioeconomic status
- Special or clinical populations

Interventions
- What types of interventions are relevant
- Identify elements of a program/intervention that are critical

Outcomes
- What is the purpose of the intervention (e.g. quality of life, transition, etc)

Study Design
- What study designs are most appropriate (e.g. RCT)
Inclusion / Exclusion Criteria

- Criteria to consider:
  - Geographic considerations
  - Time restrictions
    - If limiting the research to specific dates, indicate reason
    - Example: interventions for low birth weight babies – date limit was 1992 because of surfactant trials
  - Language restrictions
    - Remember, it can be difficult to obtain articles in Portuguese even if you are fluent
1.2. Inclusion and exclusion criteria

Articles were included in this review if a PMI was used to treat a person diagnosed Autistic Disorder, Asperger’s Syndrome, or Pervasive Developmental Disorder Not Otherwise Specified (PDD-NOS). Studies were excluded if they did not explicitly state the participants’ diagnosis or if the diagnosis did not clearly fit the diagnostic criteria for Autistic Disorder, Asperger’s Syndrome, or Pervasive Developmental Disorder Not Otherwise Specified (PDD-NOS) (American Psychiatric Association, 2000). Additionally, studies were excluded if peers played too limited of a role in the intervention. Specifically, this excluded two types of involvement: (a) peers were only used as recipients of social initiations without any training, and (b) peer modeling, in which target children observed peers perform particular behaviors without any interaction between the two. A total of 42 articles met these criteria and are included in this review.
**Objective:** To determine the effectiveness of mindfulness-based interventions with people diagnosed with multiple sclerosis

### Table 1 SPIO narrow screen inclusion/exclusion criteria

<table>
<thead>
<tr>
<th>Inclusion Criteria</th>
<th>Exclusion Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Study design</strong></td>
<td>Randomised controlled trial, controlled trial</td>
</tr>
<tr>
<td></td>
<td>Qualitative studies</td>
</tr>
<tr>
<td></td>
<td>Single case study</td>
</tr>
<tr>
<td></td>
<td>Systematic reviews</td>
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<td></td>
<td>Literature reviews</td>
</tr>
<tr>
<td></td>
<td>Guidelines Audit</td>
</tr>
<tr>
<td><strong>Population</strong></td>
<td>Age &gt;18 years Any diagnosis of MS</td>
</tr>
<tr>
<td></td>
<td>&lt;18 years old Diseases other than (and not including) MS</td>
</tr>
<tr>
<td><strong>Intervention</strong></td>
<td>Any specifically mindfulness-based intervention (MBI)</td>
</tr>
<tr>
<td></td>
<td>Psychotherapy Drug treatments Manual therapy (i.e. massage)</td>
</tr>
<tr>
<td><strong>Outcomes</strong></td>
<td>Perceived stress Anxiety Depression HRQOL Pain Personal wellbeing Social participation</td>
</tr>
</tbody>
</table>

Note: SPIO is similar to PICO
Data extraction

- A coding system to extract data (i.e. study details) from each study needs to be developed prior to collecting data (i.e. searching)

- Will be discussed under Data Evaluation section
PRISMA – Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

- It is an evidence-based minimum set of items for reporting in systematic reviews and meta-analyses.
- The aim of the PRISMA Statement is to help authors improve the reporting of systematic reviews.
- The PRISMA Statement consists of a 27-item checklist and a four-phase flow diagram.
- [http://www.prisma-statement.org/statement.htm](http://www.prisma-statement.org/statement.htm)
Data Management

PRISMA 2009 Flow Diagram

- # of records identified through database searching
- # of additional records identified through other sources
- # of records after duplicates removed
- # of records screened
- # of records excluded
- # of full-text articles assessed for eligibility
- # of full-text articles excluded, with reasons
- # of studies included in qualitative synthesis
- # of studies included in quantitative synthesis (meta-analysis)

# Data Management

## PRISMA 2009 Checklist

<table>
<thead>
<tr>
<th>Section/topic</th>
<th>#</th>
<th>Checklist Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>TITLE</td>
<td></td>
<td><strong>Identify the report as a systematic review, meta-analysis, or both.</strong></td>
</tr>
<tr>
<td>ABSTRACT</td>
<td></td>
<td><strong>Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.</strong></td>
</tr>
<tr>
<td>INTRODUCTION</td>
<td></td>
<td><strong>Describe the rationale for the review in the context of what is already known.</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICO/S).</strong></td>
</tr>
<tr>
<td>METHODS</td>
<td></td>
<td><strong>Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.</strong></td>
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<td></td>
<td><strong>Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).</strong></td>
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<tr>
<td></td>
<td></td>
<td><strong>Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>State the principal summary measures (e.g., risk ratio, difference in means).</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I², for each meta-analysis).</strong></td>
</tr>
</tbody>
</table>
## Data Management

### PRISMA 2009 Checklist

<table>
<thead>
<tr>
<th>Section/topic</th>
<th>#</th>
<th>Checklist item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk of bias across studies</td>
<td>15</td>
<td>Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).</td>
</tr>
<tr>
<td>Additional analyses</td>
<td>16</td>
<td>Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.</td>
</tr>
</tbody>
</table>

#### RESULTS

| Study selection               | 17  | Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram. |
| Study characteristics         | 18  | For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations. |
| Risk of bias within studies   | 19  | Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12). |
| Results of individual studies | 20  | For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot. |
| Synthesis of results          | 21  | Present results of each meta-analysis done, including confidence intervals and measures of consistency. |
| Risk of bias across studies   | 22  | Present results of any assessment of risk of bias across studies (see item 15). |
| Additional analysis           | 23  | Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see item 16]). |

#### DISCUSSION

| Summary of evidence           | 24  | Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers). |
| Limitations                   | 25  | Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias). |
| Conclusions                   | 26  | Provide a general interpretation of the results in the context of other evidence, and implications for future research. |

#### FUNDING

| Funding                      | 27  | Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review. |


For more information, visit: [www.prisma-statement.org](http://www.prisma-statement.org)
Bibliographic Data Management

- Determine at the beginning of the research planning, what bibliographic management software you will use to manage and track data (i.e. references, citations)
  - Endnote ($)
    - UofC Library supports
  - Refworks (free)
    - UofC Library supports
  - Mendeley (free)
    - UofC Library supports
  - Others
Data Management

Use bibliographic management software to:

- Maintain a searchable database of references related to the systematic review
- Store all references selected for the systematic review
- Keep track of number of references from each database
- Determine number of duplicate references
- Store all discarded references
- Store article PDFs
- Create citations and bibliography when writing up the results of the SR
Stage 2: Data Collection
Steps in Data Collection

- The Literature Search
- Identifying resources to search
The literature search is the most important part of a systematic review (Campbell Collaboration).

The literature search is how you obtain your data for your study.

The goal of the literature search is to find all relevant studies including:

- Traditional peer reviewed literature
- Grey literature
The systematic review literature search must:

- Be well documented
- Be transparent and reproducible
- Include a diversity of resources
- Be iterative
Consult with your subject liaison librarian

**Document, Document, Document**

- Databases searched, date range searched, date last searched
- All search terms for each database, as far as possible
- Follow the PRISMA (or other) flowchart
  - Number of hits for each database searched
  - Duplicates within databases
The Literature Search

Search Strategy

Key concepts to be searched (PICOS if using)
- How are these terms represented in different disciplines?
- What are related terms / synonyms? Be as comprehensive as possible
- What are the subject headings (e.g. MeSH) in each database?

Review known relevant articles to determine keywords and subject headings

Review previous relevant systematic reviews for possible strategy
- Is there a Cochrane group that has recommended terms
The Literature Search

- **Search Strategy**
  - Use truncation
    - nurs* will retrieve: nursing, nurse, nurses, nurses, nursed, etc
  - Use both free text (keywords) and subject headings when possible
  - Pilot your search strategy
    - Is your search retrieving the known articles?
    - If no, why not?
      - Check indexing
      - Check truncation
      - Check free text keywords
      - Check descriptors / subject headings
  - It takes a LOT OF TIME
Are SSRIs effective for treating autism in children?

<table>
<thead>
<tr>
<th>SSRIs</th>
<th>AND</th>
<th>Autism</th>
<th>AND</th>
<th>Children</th>
</tr>
</thead>
<tbody>
<tr>
<td>selective serotonin reuptake inhibitor* OR serotonin update Inhibitor OR 5-HT update inhibitor* OR SSRI</td>
<td>autis* OR infantile autism OR autistic disorder OR ASD OR asperger*</td>
<td>child* OR infan* OR toddler* OR preschool*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
What are the effective pre-graduation interventions (programs, strategies, skill training, etc) aimed at persons with autism spectrum disorders that result in employment in mainstream competitive employment settings?

<table>
<thead>
<tr>
<th>Autism</th>
<th>AND</th>
<th>Age</th>
<th>AND</th>
<th>Intervention</th>
<th>AND</th>
<th>Employment</th>
</tr>
</thead>
</table>


The Literature Search

- Save your searches in each database
  - Create an account within the database interface
  - Label the search clearly (is it a draft, final, date, database name)

- Keep detailed records of all searches conducted:
  - Month, date, year of search
  - Database searched
  - Exact search strategy
  - Any limits used (year of publication, language, etc)
  - Number of hits for each database

- Remember – goal is to report search strategy in a transparent manner so that it can be replicated
The Literature Search

- **PRESS** (Peer Review of Electronic Search Strategies)
  - **Translation:** Is the search question translated well into search concepts?
  - **Operators:** Are there any mistakes in the use of Boolean or proximity operators (e.g. ADJ)
  - **Subject Headings:** Are any important subject headings missing or have irrelevant ones been included?
  - **Natural language:** Are any natural language (i.e. free text) terms or spelling variances missing? Is truncation used correctly?
PRESS continued

- **Spelling & Syntax**: does the search strategy have any spelling mistakes, system syntax errors, or wrong line numbers?
- **Limits**: Do any of the limits used seem unnecessary or inappropriately used?
- **Adapted for database**: has the search strategy been adapted for each database to be searched?

- It is a good idea to use PRESS with other researchers and your subject liaison librarian to review your search strategy systematically.

CADTH (Canadian Agency for Drugs and Technologies in Health) http://www.cadth.ca/en/publication/781
Identifying Sources

Data sources

- Databases
- Reference searching
- Cited by (forward citations searching, citation pearl growing)
- Contact with experts
- Hand searching key journals, journals with poor/no indexing
- Grey literature
UofC Library databases:

http://library.ucalgary.ca/search-collections/databases-subject-or-name

Ask yourself: which disciplines inform my research

Educational interventions for young adults with ASD for gaining employment

Different interfaces require different searching techniques

- Review online tutorials
- Meet with your liaison librarian
Grey literature is defined as:

- publicly available, foreign or domestic, open source information that is usually available only through special channels and may not enter normal channels or systems of publication, distribution, bibliographic control, or acquisition by book sellers or subscription agents (U.S. Interagency Grey Literature Working Group 1995).
## Grey Literature

<table>
<thead>
<tr>
<th>Grey Literature Includes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government reports</td>
</tr>
<tr>
<td>Academic papers</td>
</tr>
<tr>
<td>Conference papers &amp; abstracts</td>
</tr>
<tr>
<td>Newsletters</td>
</tr>
<tr>
<td>Discussion reports</td>
</tr>
<tr>
<td>Technical documents</td>
</tr>
<tr>
<td>Working papers</td>
</tr>
</tbody>
</table>

Locating Grey Literature:

- Consider what types of organizations or associations are likely to be interested in the same research question:
  - Government agencies / NGO agencies
  - Government departments
  - Industry, trade, professional organizations
  - Advocacy groups
  - Private agencies
Grey Literature

Locating Grey Literature:

- Canadian
  - Canadian Health Research Collection
  - Canadian Public Policy Collection
- OpenGrey
  - Resource of grey literature in Europe
- Grey Literature Report
  - New York Academy of Medicine
- Dissertations / Theses
  - Proquest Dissertations and Theses
The Literature Search

We therefore conducted a systematic review to determine the comparative efficacy of NPWT versus alternate TAC techniques on in-hospital mortality, length of hospital or intensive care unit (ICU) stay, fascial closure rate, and adverse events in critically ill adults with open abdominal wounds.

MATERIALS AND METHODS

Methods for inclusion and analysis of articles and reporting of their results were prespecified in a protocol (available at www.traumacanada.org/Default.aspx?pageId=829763) developed according to the Preferred Reporting Items for Systematic Reviews and Meta-analyses\(^{24}\) and the Meta-analysis Of Observational Studies in Epidemiology proposal.\(^{25}\)

Search Strategy

Two surgical investigators (D.J.R., A.W.K.) created a preliminary search strategy by selecting exploded Medical Subject Heading terms and keywords for IAH/ACS, NPWT and alternate TAC techniques, trauma or sepsis, and critical care. A medical librarian (H.L.R.) subsequently refined this strategy by conducting iterative database queries and incorporating novel terms when new relevant citations were found. Searches were conducted in the following databases from their inception to July 6, 2011, without restrictions: MEDLINE, PubMed, EMBASE, Scopus, Web of Science, the Cochrane Central Register of Controlled Trials (CENTRAL), the Cochrane Database of Systematic Reviews, the Database of Abstracts of Reviews of Effects, the National Institute for Health Research Economic Evaluation Database, the Health Technology Assessment Database, and the Turning Research into Practice database (Appendix 1 shows the refined MEDLINE search). To identify unpublished studies, we also investigated two clinical trials registries (ClinicalTrials.gov and Current Controlled Trials), questioned field experts, and wrote the manufacturer of a NPWT device (Kinetic Concepts Inc. [KCI], San Antonio, TX). Additional citations were located by using the PubMed “related articles” feature and hand-searching reference lists of included trials and relevant reviews\(^{16,26-27}\) and guidelines\(^{1,2,5}\). We corresponded with several authors to clarify study procedures.\(^{17,19-21}\)
Figure 1. Flow chart of steps in systematic review.
Stage 3: Data Evaluation

Stage 1: Problem Formulation
Stage 2: Data Collection
Stage 4: Data Analysis
Stage 5: Reporting Findings
Data extraction is the process by which researchers obtain the necessary information about study characteristics and findings.

- Standardized data extraction provides consistency, thereby potentially reducing bias, improving validity and reliability.
  - Ensures that the same information is obtained (extracted) from each study.
  - Identifies key components of the research including interventions, subjects, and methods.

- Should be developed early in the project.
- Pilot the data extraction form with a sample of studies.
  - Keep track of revisions, corrections, amendments.
- If possible, pilot the exporting, analysis, and outputs of the data extraction form.
Data Coding

- Levels of Coding
  - Abstract screening
  - Study eligibility screening
  - Study content coding
Abstract Data Coding

- Abstract Screening
  - Is the study relevant based on the title and abstract
    - Apply title/abstract eligibility criteria
    - If yes, retrieve full text
      - If unclear, retrieve full text
      - Exclude obviously irrelevant studies
    - Include two trained raters working independently if possible
Full-Text Data Coding

- Full-Text Eligibility Screening
  - Develop an eligibility screening form based on the inclusion / exclusion criteria
  - Complete for each study retrieved that is potentially eligible
    - Include reasons for ineligible studies (for PRISMA reporting)
Data extraction form:

- Be consistent in the order and style you use to describe the information from each study
- Provide instructions, decision rules, and training on the use of the data extraction form
- Practice using the data extraction form
  - Compare completed pilot forms
  - Ensure that there is consistency in extracting data
  - Ideally two researchers should independently perform data extraction
- Record any missing information as unclear or not described
  - Makes it clear that the information was not included in the study rather than you forgot to extract it
Box 1.4 Example information requirements for data extraction

**General information**
- Researcher performing data extraction
- Date of data extraction

**Identification features of the study:**
- Record number (to uniquely identify study)
- Author
- Article title
- Citation
- Type of publication (e.g., journal article, conference abstract)
- Country of origin
- Source of funding

**Study characteristics**
- Aim/objectives of the study
- Study design
- Study inclusion and exclusion criteria
- Recruitment procedures used (e.g., details of randomisation, blinding)
- Unit of allocation (e.g., participant, GP practice, etc.)

**Participant characteristics**
- Characteristics of participants at the beginning of the study e.g.
  - Age
  - Gender
  - Ethnicity
  - Socio-economic status
  - Disease characteristics
  - Co-morbidities
- Number of participants in each characteristic category for intervention and control group(s) or mean/median characteristic values (record whether it is the number eligible, enrolled, or randomised that is reported in the study)

(Continued)

**Intervention and setting**
- Setting in which the intervention is delivered
- Description of the intervention(s) and control(s) (e.g., dose, route of administration, number of cycles, duration of cycle, care provider, how the intervention was developed, theoretical basis (where relevant))
- Description of co-interventions

**Outcome data/results**
- Unit of assessment/analysis
- Statistical techniques used
- For each pre-specified outcome:
  - Whether reported
  - Definition used in study
  - Measurement tool or method used
  - Unit of measurement (if appropriate)
  - Length of follow-up, number and/or times of follow-up measurements
- For all intervention group(s) and control group(s):
  - Number of participants enrolled
  - Number of participants included in analysis
  - Number of withdrawals, exclusions, lost to follow-up
  - Summary outcome data e.g.
    - Dichotomous: number of events, number of participants
    - Continuous: mean and standard deviation
- Type of analysis used in study (e.g., intention to treat, per protocol)
- Results of study analysis e.g.
  - Dichotomous: odds ratio, risk ratio and confidence intervals, p-value
  - Continuous: mean difference, confidence intervals
- If subgroup analysis is planned the above information on outcome data or results will need to be extracted for each patient subgroup
- Additional outcomes
- Record details of any additional relevant outcomes reported
- Costs
- Resource use
- Adverse events

NB: Notes fields can be useful for occasional pieces of additional information or important comments that do not easily fit into the format of other fields.
Cochrane has developed templates that can be revised
- Google: “data extraction form” cochrane

Review published systematic reviews relevant to your research area
- Request permission to adapt the data extraction form
Study Content Coding

- **Software for data extraction**
  - RevMan (Cochrane – can use free of charge for academic purposes)
  - EPPI-Reviewer (one month free trial)
  - JBI Sumari (subscription based)
  - NVivo (UofC site license)
  - Abstraktr
  - Excel
Stage 4: Data Analysis
Analyzing the Evidence

- Each included study is analyzed for bias and quality
- Can be component of data extraction form
  - Cochrane risk of bias framework
  - GRADE system
  - Method quality / critical appraisal checklists
    - Quantitative
    - Qualitative

- Critical appraisal resources:
Stage 5: Reporting Findings
Reporting Findings

- **EQUATOR Network**
  - Provides links to key reporting guidelines including PRISMA, CONSORT, STROBE, etc
Reporting Findings

- If you plan on publishing in a journal
  - Review the intended journal for specific guidelines for systematic reviews BEFORE starting your review
  - If there are no guidelines, review other systematic reviews in the intended journal
Archiving Your Review

The University of Calgary Institutional Repository, also known as DSpace, is a digital archive comprised of the University's intellectual output.

DSpace serves to manage, preserve and make available the academic works of faculty, graduate students, and research groups.

Submit your systematic review
Open Access journals make their articles free for readers to access without subscription and licensing restrictions.

- Open Access Authors Fund
  - Pays processing fees for articles accepted for publication in open access journals
  - [http://library.ucalgary.ca/open-access-authors-fund](http://library.ucalgary.ca/open-access-authors-fund)
Updating Your Review

Given the time it takes to complete a systematic review, you may need to update the search prior to submission for publication.

You may need to update your systematic review as a requirement of the publishing body (Cochrane) or as new evidence is published.

Because you kept detailed, transparent documentation on data collection (searching) and because you saved your searches on the different database platforms, updating the search can be done relatively quickly.
How does your systematic review stand up?

Review:

Appraisal of a systematic review using a checklist:

Notes and example 1

Clinical Evidence (BMJ)

http://clinicalevidence.bmj.com/x/set/static/ebm/toolbox/665052.html
Contact:

Health Sciences Library
hslibr@ucalgary.ca
403.220.6855

Drop-In Consultation Office
Monday – Friday 8:00 am – 4:30 pm