A Review of Systematic Reviews

Ed Sperr, Clinical Information Librarian
Julie Gaines, Campus Director of the Library
Systematic reviews are increasingly important

Proportion of citations in PubMed
proportion for each search by year, 1945 to 2018

https://esperr.github.io/pubmed-by-year/
... though still just a portion of all reviews

Made with PubMed by Year: http://esperr.github.io/pubmed-by-year/

https://esperr.github.io/pubmed-by-year/
Reviews come in different flavors

What makes a review systematic?

“A systematic review attempts to collect and analyze all evidence that answers a specific question. The question must be clearly defined and have inclusion and exclusion criteria. A broad and thorough search of the literature is performed and a critical analysis of the search results is reported and ultimately provides a current evidence-based answer to the specific question.”

It’s a process...

A systematic review attempts to **collect and analyze all evidence that answers a specific question**. The question must be clearly defined and have inclusion and exclusion criteria. A broad and thorough search of the literature is performed and a critical analysis of the search results is reported and ultimately provides a current evidence-based answer to the specific question.
You will likely have to review a lot of items...

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Searches for published and unpublished studies.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

Review Team: Team Members at minimum...

• Content expert
• 2 reviewers
• 1 tie breaker
• 1 statistician (meta-analysis)
• 1 librarian (expert searcher) trained in systematic reviews

The importance of a clear focus

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## Defining your question

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<tr>
<th>P</th>
<th>I</th>
<th>C</th>
<th>O</th>
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<tbody>
<tr>
<td>Patient, Population</td>
<td>Intervention (or Exposure)</td>
<td>Comparison (or Control) if appropriate</td>
<td>Outcome</td>
</tr>
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### S | PI | D | E | R
---|---|---|---|---
Sample | Phenomenon of Interest | Design | Evaluation | Research type |

### S | P | I | C | E
---|---|---|---|---
Setting (where?) | Perspective (for whom?) | Intervention (what?) | Comparison (compared with what?) | Evaluation (with what)

Defining your question

"Is animal-assisted therapy more effective than music therapy in managing aggressive behavior in elderly people with dementia?“

Patients - elderly patients with dementia
Intervention - animal-assisted therapy
Comparison - music therapy
Outcome – aggressive behavior
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Considerations for constructing your search

• Keywords vs. Subject Headings
• Can you formally *combine* parts of a search?
• Do you want to limit by date or by language? (And are you limiting for the right reasons?)
Keywords vs Subject headings


https://pubvenn.appspot.com/
Searches can get complicated...

#1 Dementia [tw]
#2 Alzheimer [tw]
#3 Huntington* [tw]
#4 Kluver [tw]
#5 Lewy [tw]
#6 Dementia [mh]
#7 #1 OR #2 OR #3 OR #4 OR #5 OR #6
#8 Animal-assisted therapy [tw]
#9 Animal-assisted activit* [tw]
#10 Animal-assisted intervention* [tw]
#11 Animal therapy [tw]
#12 Pet therapy [tw]
#13 Dog therapy [tw]
#14 Dog-assisted therapy [tw]
#15 Canine-assisted therapy [tw]
#16 Aquarium [tw]
#17 Animal Assisted Therapy [mh:noexp]
#18 Pets [mh]
#19 Dogs [mh]
#20 Cats [mh]
#21 Birds [mh:noexp]
#22 Bonding, Human-Pet [mh]
#23 Animals, Domestic [mh:noexp]

#24 #8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14 OR #15 OR #16 OR #17 OR #18 OR #19 OR #20 OR #21 OR #22 OR #23
#25 Music therapy [tw]
#26 Music* [tw]
#27 Singing [tw]
#28 Sing [tw]
#29 Auditory stimulat* [tw]
#30 Music [mh]
#31 Music Therapy [mh]
#32 Acoustic Stimulation [mh]
#33 Singing [mh]
#34 #25 OR #26 OR #27 OR #28 OR #29 OR #30 OR #31 OR #32 OR #33
#35 Aggression [tw]
#36 Neuropsychiatric [tw]
#37 Apathy inventory [tw]
#38 Cornell scale [tw]
#39 Cohen Mansfield [tw]
#40 BEHAVE-AD [tw]
#41 CERAD-BRSD [tw]
#42 Behavior* [tw]
#43 Behaviour* [tw]
#44 Aggression [mh]
#45 Personality inventory [mh]
#46 Psychomotor agitation [mh]

#47 #35 OR #36 OR #37 OR #38 OR #39 OR #40 OR #41 OR #42 OR #43 OR #44 OR #45 OR #46
#48 #7 AND #24 AND #34 AND #47
Possible sources

Bibliographic databases
• PubMed
• Web of Science
• Google Scholar (*)
• Discipline-specific databases

Grey Literature
• Open Grey
• Science.gov
• Conference proceedings

Manual searching
• “Hand searching” selected journals
• “Snowball” selection of citations from other reviews
Documenting your methods

- **Cochrane Handbook**: 6.6 Documenting and reporting the search process
  [http://handbook-5-1.cochrane.org/](http://handbook-5-1.cochrane.org/)

- **National Academies of Sciences, Engineering, and Medicine**: 3.4 Document the search; 5.1.6. Include a methods section
Setting a Protocol

• Pre-specifies objectives and methods of systematic review
• Helps prevent biased *post hoc* decisions in review methods
• Can modify protocols during the research, however one must consider the effects that modifications may have on the results, especially if the primary outcome is changed
Registering a Protocol

PROSPERO will not be available from 08:00 BST on Friday 4th October until 08:00 BST on Monday 7th October for essential maintenance. We apologise for any inconvenience.

https://www.crd.york.ac.uk/PROSPERO/
Screening your results

• You will likely discard most items that you find

• Who decides what stays?  
  (and what happens if members of the team disagree?)

• Can you *automate* any part of this process?
SR management software

• Covidence
• DistillerSR
• Rayyan (free!)
• Abstrackr (free!)
• Excel / Google sheets
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“Meta-analysis is a quantitative, formal, epidemiological study design used to **systematically assess** previous research studies to derive conclusions about that body of research. Outcomes from a meta-analysis may include a **more precise** estimate of the effect of treatment or risk factor for disease, or other outcomes, **than any individual study contributing to the pooled analysis**. The examination of variability or heterogeneity in study results is also a critical outcome.”

Performing a meta-analysis

• OpenMeta[Analyst]
• STATA / R / SAS

Make sure you consult a statistician
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Welcome to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) website!

PRISMA is an evidence-based minimum set of items for reporting in systematic reviews and meta-analyses. PRISMA focuses on the reporting of reviews evaluating randomized trials, but can also be used as a basis for reporting systematic reviews of other types of research, particularly evaluations of interventions.

Who should use PRISMA?

- Authors: PRISMA aims to help authors improve the reporting of systematic reviews and meta-analyses.
- Journal Peer reviewers and editors: PRISMA may also be useful for critical appraisal of published systematic reviews, although it is not a quality assessment instrument to gauge the quality of a systematic review.

http://prisma-statement.org/
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<th>ID</th>
<th>Title</th>
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<td>1</td>
<td>Identify the report as a systematic review, meta-analysis, or both.</td>
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<td>Risk of bias in individual studies</td>
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<td>Summary measures</td>
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<td>Synthesis of results</td>
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<td>Additional analyses</td>
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Questions?

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• Julie Gaines (jkgaines@uga.edu)

Note:
Some content taken from the course “Systematic Reviews: Opportunities for Librarians”, presented by Emily Ginier and Kate Saylor
Fall into Research
Workshop series presented by
the UGA Science Library and the UGA Graduate School

Friday, October, 4, 2019

Keynote Talk
10:00am-11:00am Science Library Rm 382
What I Wish I had Known and What I Wish My Students Knew for Graduate School
Graduate school can feel isolating with ill-defined goals and metrics of success. I will cover my path to a PhD in chemistry and professorship, my experiences as a mentor, lessons learned, and what I wish I had known ahead of time.

Workshop
3:30pm-5:00pm Science Library Rm 382
Getting Work Done: Creating Professional and Research Goals Workshop Create achievable and actionable goals for both your research and your professional life: work efficiently and effectively to achieve your goals! See information about other sessions and register: tinyurl.com/fallintoresearch19

Dr. Emily Pentzer
Associate Professor of Chemistry and Materials & Engineering
Texas A&M University