Cochrane

Improving Search Strategies through Peer Review: Background, Methods & Pilot Evaluation

Robin Featherstone, MLIS
Information Specialist
Cochrane Editorial & Methods Department

Anne Littlewood, MPhil
Information Specialist
Cochrane Oral Health

Trusted evidence.
Informed decisions.
Better health.

Cochrane

COI

Robin and Anne are both employed by Cochrane and involved in the conduct and evaluation of search peer review (PR)

Cochrane

Agenda

Background: Searching Errors and Peer Review

Pilot Summary from the Networks

Lessons Learned from the Pilot

Discussion

Cochrane

Background

Searching for studies…

- is a fundamental element of systematic review (SR) production
- is best conducted by an Information Specialist (IS)
- affects overall quality of SRs
- benefits from subjective validation

Cochrane

Cochrane

An Overview of Search Problems

Ranked according to variables:

- impact on recall
- impact on precision
- importance in peer review

First-order problems	Second-order problems
- Errors in conceptualization - Errors using logical operators - Spelling errors - Error in the combination of lines - Missing MeSH terms	- Missing free-text language - Missing free-text and MeSH combinations - Missing spelling variants - Inadequate truncation - Irrelevant free-text language - Inadequate use of limits

(Sampson, 2009)

Cochrane

Search Problems in Cochrane SRs

2006 Study (Sampson) of 63 Cochrane SRs

- 90.5% of the strategies had ≥1 problem
- 82.5% had ≥1 problem that could have affected recall

2018 Study (Franco) of 59 Cochrane SRs

- 73.0% of the strategies had ≥1 problem
- 53.0% had ≥1 first-order problem

Cochrane

Top 5 Search Errors:

1. Missed MeSH terms (44.4%)
2. Unwarranted explosion of MeSH terms (38.1%)
3. Use of irrelevant MeSH or free text terms (28.6%)
4. Missed spelling variants (20.6%) ; Strategy not tailored for other databases (20.6%)
5. Logical operator error (19.0%)

(Sampson, 2006)

Cochrane

How to Avoid...

24. ((diphtheria* or dtap* or h?emophilus influenza* type b or pertussis* or polio* or tetanus*) and vaccin*).tw,kf.
25. immuni#ation*.tw,kf.
26. immuni#e*.tw,kf.
27. immuni#ing.tw,kf.
28. innoculat*.tw,kf.
29. ((measles* or MMR* or mumps* or rubella* or varicella*) and vaccin*).tw,kf.
30. nonimmuni#e*.tw,kf.
31. (under-immuni#ation* or underimmuni#ation*).tw,kf.
32. unimmuni#e*.tw,kf.
33. vaccinat*.tw,kf.
34. or/1-33 [Combined MeSH & text words for immunization]

Cochrane

Search Peer Review (PR):

- Historically informal process
- Evidence-base to support is small, but growing
- Validated tools (checklists) are now available
- Search PR forums now exist (e.g., PRESS Forum)
- Many SR producers recommend or require peer review

(SuRe Info, 2017)

Cochrane

What is PRESS?

- Peer Review of Electronic Search Strategies
- Originally developed in 2008-2010, and updated in 2015 (McGowan, 2016)
- Recommends six key search elements for evaluation
- Includes a guideline statement and a validated checklist
- Based on a SR, web-based survey of experts and a consensus development forum

Cochrane

Six essential PRESS elements

1. Translation
2. Boolean and proximity operators
3. Subject headings
4. Text word searching
5. Spelling, syntax and line numbers
6. Limits and filters

Cochrane

First Order Problem: Error in the Combination of Lines (Element 5)

1. Acetaminophen/
2. Analgesics/
3. 1 or 2
4. Migraine Disorders/
5. 3 and 4
6. Animals/ and Humans/
7. 4 not 6
8. random*.mp.
9. 7 and 8

5. SPELLING, SYNTAX, AND LINE NUMBERS		
	A. No revisions	□
	B. Revision(s) suggested	□
	C. Revision(s) required	X

If "B" or "C," please provide an explanation or example:
Line 7 – this should be 5 rather than 4 (i.e., 5 not 6)

Cochrane

Second Order Problem: Missing free text language (Element 4)

1. Acetaminophen/
2. Analgesics/
3. 1 or 2
4. Migraine Disorders/
5. 3 and 4
6. Animals/ and Humans/
7. 4 not 6
8. random*.mp.
9. 7 and 8

4. TEXT WORD SEARCHING		
	A. No revisions	□
	B. Revision(s) suggested	X
	C. Revision(s) required	□

If "B" or "C," please provide an explanation or example:
Adding text words for both the acetaminophen and migraine concepts could retrieve relevant studies

Cochrane

Search PR Guidance

Cochrane Handbook v 6 (Section 4.4.8)	Strongly recommends search PR	https://training.cochrane.org/handbook
Institute of Medicine (Standard 3.1)	Requires search PR	https://www.nap.edu/read/13059/chapter/5#106
Centre for Reviews and Dissemination (Appendix 2)	Recommends search PR	https://www.york.ac.uk/media/crd/Systematic_Reviews.pdf
Developing NICE guidelines: the manual - 2018 update (Section 5.7)	Requires quality assurance w/ a checklist such as the PRESS checklist	https://www.nice.org.uk/process/pmg20/chapter/identifying-the-evidence-literature-searching-and-evidence-submission#quality-assurance
AHRQ Methods Guide (Chapter 5)	Requires search PR w/ PRESS checklist to develop the search	https://effectivehealthcare.ahrq.gov/sites/default/files/pdf/cer-methods-guide_overview.pdf
IQWiG General Methods (Section 7.1.1)	Requires formal quality assurance following the PRESS guidelines	https://www.iqwig.de/download/IQWiG_General_Methods_Version_%204-2.pdf

Cochrane

Evidence in Support of Search PR

Relevo (2012) study of 25 IS using PRESS checklist

- 82% indicated the checklist was helpful
- 97% of searches were not revised because of the timing of the PR – conducted too late to amend the searches!

Spry (2018) study of 200 rapid reviews

- 75% of peer reviewed searches increased retrieval
- 4% or peer reviewed searches identified an additional included study

Cochrane

With some certainty, we know...

- To be effective, search PR must occur during protocol development (Relevo, 2012), as soon as the MEDLINE (or other primary) search is developed and before it is translated for other databases or run to identify studies (McGowan, 2015)
- Use of the PRESS checklist reduces time to conduct search PR and increases the likelihood of error identification (Relevo, 2012)
- Search PR aids in retrieval of relevant records, particularly for reviews of non-randomized studies (Spry, 2018)

Cochrane

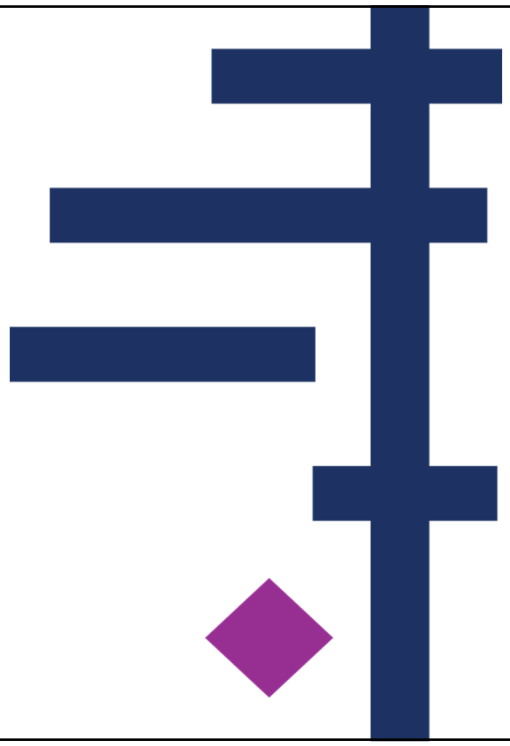
Key Points

- Timing is critical! Revise the strategy at the protocol stage
- Avoid over-analyzing or redesigning searches. Search PR should take < 2 hours
- Searching is subjective. Multiple approaches can all be valid
- When peer reviewing searches, use the PRESS checklist to save time and help focus on essential elements
- Search peer reviewers should be included in the acknowledgements section of the published review (with their permission)

Cochrane

Questions

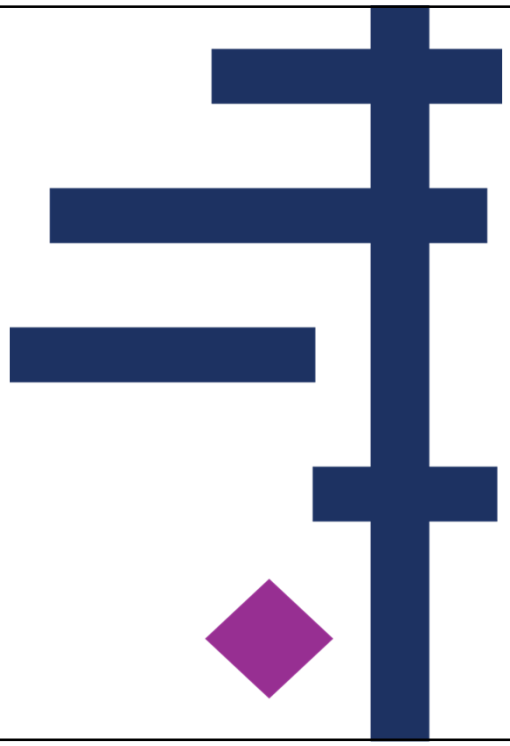
Trusted evidence.
Informed decisions.
Better health.



Cochrane

Pilot Evaluation

Trusted evidence.
Informed decisions.
Better health.



Cochrane

Pilot project in a Cochrane Network

- Project came about through thinking more about how we can work together in our networks
- CISs in the Long Term Conditions and Ageing 2 Network were agreed that peer review can be a good thing!
- Process of peer review has been difficult to establish in CIS Community

Cochrane

Long Term Conditions and Ageing 2 Network

- Known now as the MOSS Network (Musculoskeletal, Oral, Sensory and Skin Network)
- CISs from Back and Neck, ENT, Eyes and Vision, Musculoskeletal, Oral Health, PaPaS, Skin and Wounds
- Potential pool of information specialists, BUT quite diverse topic areas

Cochrane

What did we do?

- Informal collaboration via email, CIS would email the other CISs in the Network when help was needed
- Protocols only involved
- Voluntary basis
- Peer review of the search methods section and example search strategy

Cochrane

What did we do?

- Feedback provided informally
- Protocols went for search methods peer review at the same time as full peer review, with a two week turnaround
- We kept a note of time taken to referee
- “Light touch” approach, we were looking for obvious errors, or things we might do differently - not learning a whole new topic area

Cochrane

What did we do?

- Liz Doney at Cochrane Skin emailed for help with peer review on three protocols:
  - Interventions for folliculitis and boils
  - Topical treatments for eczema (network meta-analysis)
  - Interventions for pruritus of unknown cause
- Sam Cox (ENT) and Anne Littlewood (Oral Health) volunteered to peer review

Cochrane

What did we do?

- Anne and Sam compared the protocol with the searching standards outlined in MECIR for protocols
- MeSH terms used were looked up, but we didn't check for additional terms, and we checked that the PICO elements were appropriate
- We checked some free text terms in MEDLINE, to see if there were useful alternative spellings / truncation
- The PRESS checklist was used as a final check

Cochrane

Outcomes for Liz

- Recommendation around reporting who will conduct the search was incorporated into Liz's standard protocol text
- Other minor changes were made to the standard protocol text around referencing search filters
- Typos were spotted, and one error in search syntax was picked up
- Additional free text terms, alternative spellings and different approaches to combining the PICO elements were suggested

Cochrane

Outcomes for Liz

- Liz chose to take some of the peer review suggestions on board, and chose not to incorporate others
- Changes to the search methods text have improved alignment with MECIR reporting standards for Skin protocols
- She has revisited all three searches and the strategies are more robust as a result
- The changes were fed back to the author team, who were very positive about the process

Cochrane

Outcomes for Anne and Sam

- Insight into the working practices of a colleague - we learned about our practice too
- Experience of peer review methods (Liz also issued us with a certificate!)
- Positive collaboration with network colleagues to make Cochrane reviews better
- (Limited!) knowledge of a new topic area

Cochrane

Lessons learned from the pilot

- Value of a standardised form

  Sam comments: *"It was more useful to just run through the PRESS checklist at the end to check I hadn't missed anything because of overlap with the MECIR standards. However it was easier to read than MECIR, so perhaps we need our own checklist."*

Cochrane

Lessons learned from the pilot

- It takes time to peer review a protocol, but if we keep it light touch it doesn't have to take a massive amount of time, and there can still be valuable outcomes for the information specialist
- Two of the protocols took 45 minutes to peer review, the other took 90 minutes

Cochrane

Lessons learned from the pilot

- Standard search method text (if achievable!) could make peer review faster, and mean that the peer reviewer only has to look at the search strategy
- Some idea of the numbers the search strategy retrieves can help the peer reviewer understand the appropriateness of the PICO elements used

Cochrane

Challenges with peer review

- Timing of the request (protocol, review, update?)
- Implications for the review team of errors
- Contact people for peer-review? IS or editors or authors?
- Confidentiality

Cochrane

Discussion points

- Which checklist to use? Should it be Cochrane specific? Integrate MECIR standards?
- How to respond to comments? What if you disagree?
- How to bring comments back to the review team?
- Repeatedly reviewing for the same person has advantages (faster to review) - BUT it may be more useful to have a variety of eyes looking at an IS's work?

Cochrane

Discussion points

- Should we attempt to do this on a Network basis? It worked well for the pilot, but we had a number of CIS in the network who had the time to engage.
- Should we make it a Cochrane-wide project?

Cochrane

Resources

CIS Portal (under Searching: Reporting) includes a peer review section: https://community.cochrane.org/organizational-info/resources/resources-groups/information-specialists-portal

- PRESS checklist and other peer review forms
- Report on pilot project

HTAi Vortal (under Peer reviewing search strategies): http://vortal.htai.org/index.php?q=book/export/html/918

Cochrane

References

Franco JV, Garrote VL, Liquitay CM, Vietto V. Identification of problems in search strategies in Cochrane Reviews. Research Synthesis Methods. 2018 May 15.

McGowan J, Sampson M, Salzwedel DM, Cogo E, Foerster V, Lefebvre C. PRESS peer review of electronic search strategies: 2015 guideline statement. Journal of Clinical Epidemiology. 2016 Jul 1;75:40-6.

Relevo R, Paynter R. Peer review of search strategies. Methods Research Reports. Agency for Healthcare Research and Quality (US). 2012 Jun. Report No: 12-EHC068-EF

Sampson M, McGowan J. Errors in search strategies were identified by type and frequency. Journal of Clinical Epidemiology. 2006 Oct 1;59(10):1057-e1.

Sampson M, McGowan J, Cogo E, Grimshaw J, Moher D, Lefebvre C. An evidence-based practice guideline for the peer review of electronic search strategies. Journal of Clinical Epidemiology. 2009 Sep 1;62(9):944-52.

Spry C, Mierzwinski-Urban M. The impact of the peer review of literature search strategies in support of rapid review reports. Research Synthesis Methods. 2018 Nov 8.

Summarized Research in Information Retrieval for HTA (SuRe Info): Peer reviewing search strategies [Internet]. Lefebvre C, Duffy S. Health Technology Assessment international (HTAi) Information Retrieval Group. 2017 [updated 2018 October 31; cited 2019 January 29]. Available from: http://vortal.htai.org/index.php?q=node/918