Systematic reviews

Dr Susan D Shenkin

Outline

- What is a systematic review?
- Introduction to Cochrane and EQUATOR
- How to do a systematic review?
  - Practical demonstration (Sheila Fisken)
- Presenting results
- Writing the paper

What is a systematic review?

- “an overview of primary studies which contains an explicit statement of objectives, materials, and methods and has been conducted according to explicit and reproducible methodology”

http://www.cochrane-handbook.org/

Does yours do this?????
Systematic literature review?

- A **systematic review** attempts to identify ALL data (including unpublished) related to research question
  - Very important for RCTs (randomised controlled trials) where all trials should contribute to overall effect size
  - Perhaps less important for non-RCTs

- A **systematic literature review** is of published literature, attempts to identify ALL PUBLISHED data
  - Probably adequate for non-RCTs

What is a meta-analysis?

- "a mathematical synthesis of the results of two or more primary studies that addressed the same hypothesis in the same way"

- i.e. A specific type of systematic review

Why are systematic reviews needed?

- Literature/narrative/critical review
  - Often not replicable/updated
  - May be biased by prior beliefs
  - May be commissioned due to published opinion
  - Often miss small but important effects
  - Different reviewers reached different conclusions
  - Affected by subspecialty of reviewer
  - Little attempt to discuss heterogeneity

- Benefits of therapy not brought into clinical practice
  - e.g. Clot-busters/beta blockers for heart attacks
  - SR would have identified benefit in mid-1970s
  - Not in clinical practice till 1990s

- Inadequate summaries of current knowledge
  - Omitted mention of effective treatment, or suggested only as part of trials

Why are reviews needed?

- Massive numbers of publications
- Both print, and electronic media
- Diverse languages
- Different countries
- Primary studies can appear contradictory
- Psychology and social sciences predated medical systematic reviews (1930s)

Antman et al, JAMA 1992;268:240-248
Why are systematic reviews needed?

- As part of student dissertation/PG thesis
- To secure grant funding for research
- To propose future research agenda
- To establish clinical or cost-effectiveness
- To establish feasibility of an intervention
- To allow information to be assimilated quickly and easily
- To reduce delay of research to clinical implementation
- Note this is as substantial a piece of work as original research

Why are systematic reviews needed?

- Mostly
  - A substantive question
  - Several primary studies
  - Uncertainty
- Can be of
  - RCTs (randomised controlled trials) of intervention (vaccine, drug, behaviour)
    - e.g. MMR, clot busters, exercise after stroke
  - Observational studies
    - e.g. Birth weight and IQ, IQ and mortality, WMH and morbidity/mortality

'Hierarchy of evidence'

Introduction to Cochrane

- Archie Cochrane (1909-88)
  - British epidemiologist
  - Advocated RCTs to inform healthcare practice
- Cochrane collaboration
  - Established 1993
  - Cochrane Reviews (>4,000)
  - Identify, appraise and synthesise research-based evidence and present it in accessible format; regularly updated
  - Focus on interventions, but useful resource

Introduction to EQUATOR

- Enhancing the QUAlity and Transparency Of health Research
- Started March 2006
- Grew from guideline development groups (including CONSORT)
- Aim to:
  - Provide resources and education enabling the improvement of health research reporting
  - Monitor progress in the improvement of health research reporting

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- **Detailed reporting guidelines**
  - CONSORT Statement (reporting of randomized controlled trials)
  - STARD (reporting of diagnostic accuracy studies)
  - STROBE (reporting of observational studies in epidemiology)
  - PRISMA (reporting of systematic reviews), which replaced QUOROM
  - MOOSE (reporting of meta-analyses of observational studies)

- **Minimum Information for Biological and Biomedical Investigation (MIBBI) portal**
  - e.g. minimum dataset for fMRI studies
  

Introduction to PROSPERO

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RCTs or observational studies

- **RCTs**
  - ‘gold standard’ for interventions
  - Minimise bias
  - Exposed/unexposed groups are comparable


How to do a systematic review?

1. Define a question
2. Search the literature
3. Assess the studies
4. Combine the results
5. Put the findings in context

Presenting results

- Use the 27-point PRISMA checklist
- Use the PRISMA flow diagram
Writing the paper

• Follow conventional structure
• Be clear and comprehensive
• Should be reproducible
• Check with target journal (length?)
• Very useful guide by Prof Joanna Wardlaw (SBIRC):

Resources

• http://www.cochrane-handbook.org/
• http://www.equator-network.org/
  – CONSORT http://www.consort-statement.org/
  – STARD http://www.stard-statement.org/
  – MOOSE
    – http://www.sign.ac.uk/guidelines/fulltext/50/section6.html

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Contact me: Susan.Shenkin@ed.ac.uk

www.ccace.ed.ac.uk

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