SYSTEMATIC REVIEWS

Introduction to Cochrane Ireland 2-Day Training
These slides are adapted from versions developed with the help of the UK Cochrane Centre (UKCC).

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Objectives

• To identify the main reasons for the development of systematic review
• To understand the main characteristics of systematic reviews
• To identify why standards are needed for the conduct of systematic reviews
Systematic Reviews

• ‘A systematic review attempts to collate all empirical evidence that fits pre-specified eligibility criteria in order to answer a specific research question. It uses explicit, systematic methods that are selected with a view to minimizing bias, thus providing more reliable findings from which conclusions can be drawn and decisions made.’

Why do we need systematic reviews?

- Information explosion
- 20,000—30,000 health and medical journals
- 2,000,000 articles every year
But I can keep up to date….can you?

• Physicians trained in epidemiology would take an estimated 627.5 hours [or 26x24hr days] per month to evaluate the volume of medical literature potentially relevant to primary care published in a month.
  • (Alper et al 2004)
Figure 2. The number of published trials, 1950 to 2007.

http://journals.plos.org/plosmedicine/article?id=info:doi/10.1371/journal.pmed.1000326
Reproducibility

- Individual trials may be biased or the results presented out of context.
- For example, a review of 53 ‘landmark’ studies in haematology and oncology found that the results were confirmed in … ??
- 6 cases (11%)
- Interviews: researchers were ‘all competent, well-meaning’ wanting to advance cancer research.
All reviews are not alike

- Narrative literature review
- Systematic review of nonrandomised controlled trials
- Systematic review of randomised controlled trials
- Meta-analysis of quantitative research
- Synthesis of qualitative research
Traditional literature reviews

- Expert in the field gives an overview of the state of research.
- Quicker, familiar and often read well, but...
  - May not state where they searched for literature.
  - May not give criteria by which studies were included or excluded.
  - May not explicitly evaluate the strengths and weaknesses of each study.
  - More likely to allow bias to slip in.
Aims of systematic reviews

- Adhere to a strict scientific design:
  - To make them comprehensive
  - To minimise bias
  - To ensure reliability
Systematic review characteristics

- Clearly stated set of objectives with pre-defined eligibility criteria for studies;
- Explicit, reproducible methodology;
- Systematic search that tries to identify all studies that meet the eligibility criteria;
- Assessment of the validity of the study findings, e.g. through the assessment of risk of bias (i.e. critical appraisal);
- Systematic presentation, and synthesis, of included studies with their characteristics and findings.
Review methods matter

- Two 1992 systematic reviews of low-molecular-weight (LMW) heparins and standard heparin in preventing thrombosis following surgery.

- 1: “LMW heparins seem to have a higher benefit to risk ratio than unfractionated heparin in preventing perioperative thrombosis.”

- 2: “there is at present no convincing evidence that in general surgery patients LMW heparins, compared with standard heparin, generate a clinically important improvement in the benefit to risk ratio.”
Today's Random Medical News

Can Cause

According to a report released today...
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Leizorovicz et al.</th>
<th>Nurmohamed et al.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Literature used:</td>
<td>1984-91</td>
<td>1984-92</td>
</tr>
<tr>
<td>years</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>unpublished?</td>
<td>No restrictions</td>
<td>English, German, French</td>
</tr>
<tr>
<td>languages</td>
<td>All accepted, plus ultrasound</td>
<td>All accepted</td>
</tr>
<tr>
<td>thrombosis detection methods</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assessment of trial quality</td>
<td>No</td>
<td>Eight-point scale</td>
</tr>
<tr>
<td>Analysis:</td>
<td>39</td>
<td>23 (13 considered high quality)</td>
</tr>
<tr>
<td>no. studies</td>
<td>12,375</td>
<td>8,172</td>
</tr>
<tr>
<td>no. patients</td>
<td>Fixed effects</td>
<td>Fixed effects</td>
</tr>
<tr>
<td>statistics</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>stratified by trial quality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conclusions</td>
<td>LMW heparins have higher benefit</td>
<td>No convincing evidence of benefit</td>
</tr>
</tbody>
</table>

Basic concepts of evidence-based practice

- Individual experience and/or expertise are not always reliable;
- Evidence is the accumulated experience of many people and trials;
- Evidence needs to be systematically collected to be valid and reliable;
- Evidence based practice is the integration of this evidence into clinical practice;
- Systematic reviews are ONE means of applying the concepts of evidence-based practice.
Practice needs more than systematic reviews

- Systematic reviews are not the only evidence needed
- Applicability to a particular case
- Weighing of different evidence
- Clinical judgement
- The role of professional experience
- The role of patients’ values
General Resources

• Cochrane Library: http://www.cochranelibrary.com/

• Cochrane Handbook: http://handbook.cochrane.org/

• Methodological Expectations of Cochrane Intervention Reviews (MECIR) = Standards for Cochrane reviews: http://methods.cochrane.org/mecir

• Cochrane Ireland: http://ireland.cochrane.org/

• RevMan software: http://community.cochrane.org/tools/review-production-tools/revman-5/revman-5-download
Cochrane Ireland

About Cochrane Ireland

Sharing Health Evidence You Can Trust

The Cochrane Collaboration is a global independent network of health practitioners, researchers, patient advocates and others, responding to the challenge of making the vast amounts of evidence generated through research useful for informing decisions about health. We are a not-for-profit organisation with collaborators from 120 countries working together to produce credible, accessible health information that is free from commercial sponsorship and other conflicts of interest.

Cochrane Ireland aims to promote the use of Cochrane evidence across the island of Ireland and to support engagement with The Cochrane Collaboration at all levels. This initiative is being led by Dónal O'Mathuana, PhD, appointed as Convenor of Cochrane Ireland in 2014. This post is funded jointly by the Health Research Board in the Republic of Ireland and the HSC Research & Development Division, Public Health Agency in Northern Ireland.

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