Systematic Reviews

Everything a user needs to know

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Systematic Reviews

- What are they
- How are they performed
- Advantages
- Limitations
- Bias
- How to use them

What is a systematic review?

The combining of data from several different research studies to gain a better view of a topic than what was available in any single investigation

Taber's medical dictionary

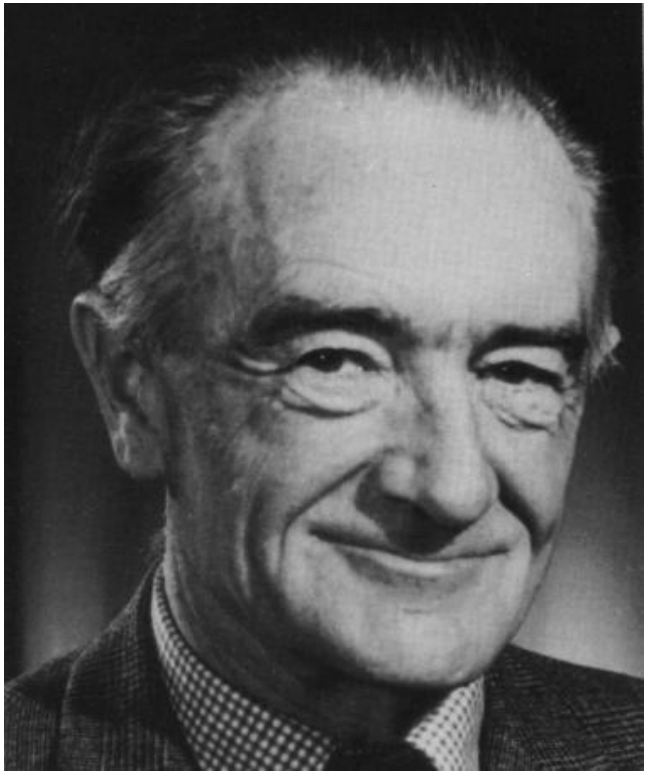
A systematic review is a high-level overview of primary research on a particular research question that tries to identify, select, synthesize and appraise all high quality research evidence relevant to that question in order to answer it.
http://en.wikipedia.org/wiki/Systematic_review#cite_note-CEBM_about-0

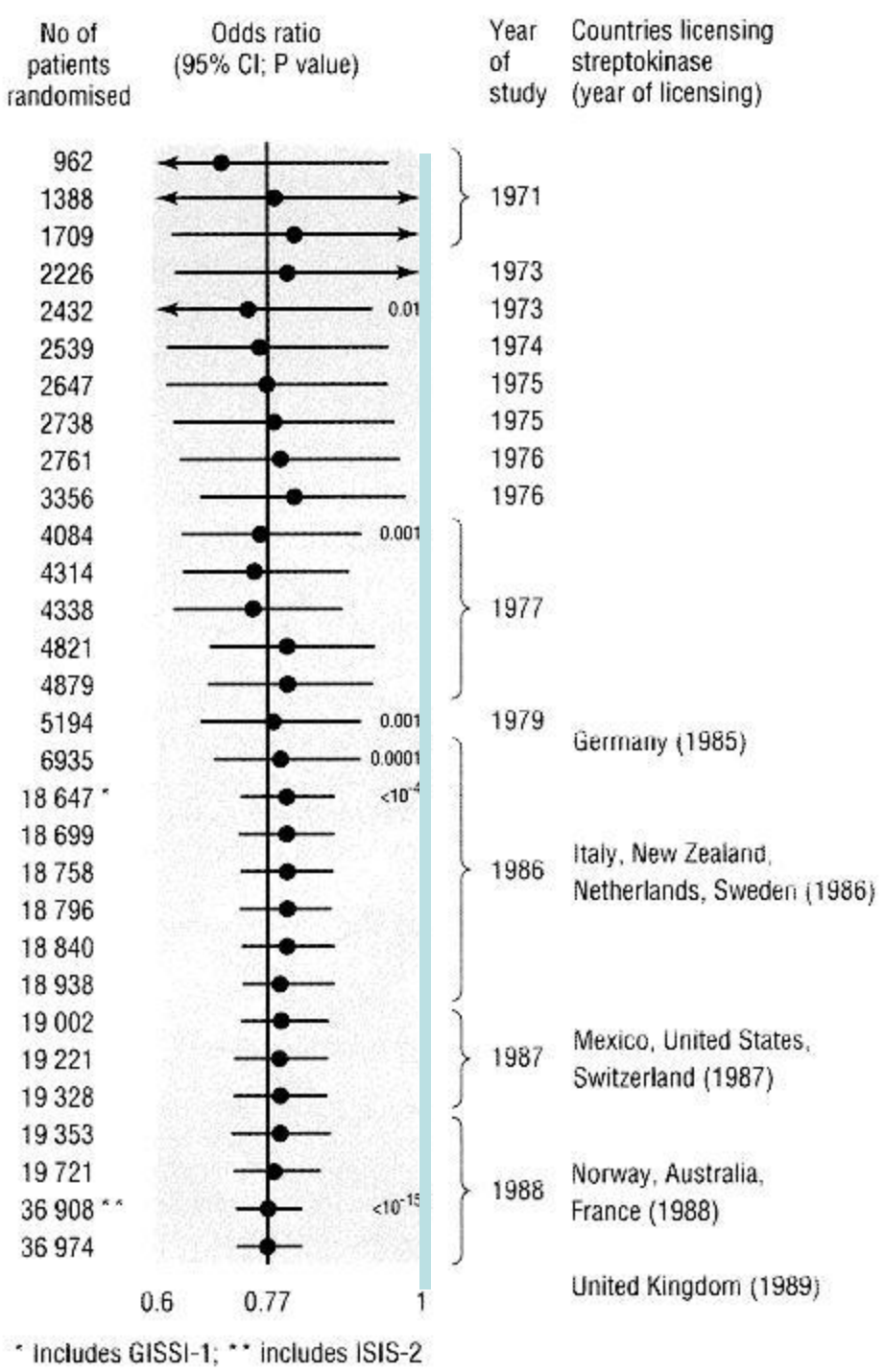
Why do we need reviews?

- Need information to make the right decisions
- But….too much information
- And…not enough time

Archie Cochrane

"It is surely a great criticism of our profession that we have not organised a critical summary, by specialty or subspecialty, adapted periodically, of all relevant randomised controlled trials." (1979)





Egger, BMJ, 1997

Review process

- Define the question (PICO)
- Look for all studies reliably addressing the question
- Sift the studies to select relevant ones
- Assess the quality* of the studies
- Calculate results for studies (and combine them)
- Interpret results

RCT quality markers

- Randomisation (and was it adequate)
- Allocation concealment
- Blinding
- Controlled
- Sufficient sample size to detect effect
- Subject flow accounted for
- Intention to treat analysis

Sources of bias in trials

- Selection – may lead to ~40% overestimation of treatment effect (allocation concealment)
- Performance – may lead to 17% overestimation (blinding of participant and carer)
- Attrition – systematic differences of loss
- Detection – very important with subjective outcomes

What is a meta-analysis?

- A statistical technique for pooling data, i.e. the final quantitative step in the review process

OR

- An entire discipline for finding, appraising and combining data from various studies

Useful when:

- Individual studies may not detect a true difference due to inadequate power
- Interest is in a smaller effect across a larger population than the original study was set up to explore

Rationale

- Cannot pool all the results from smaller trials as if from one large trial
  - Participants may be different
  - Systematic differences may effect the outcome of interest
- Can compare overall effect in one trial with that in another

Advantages

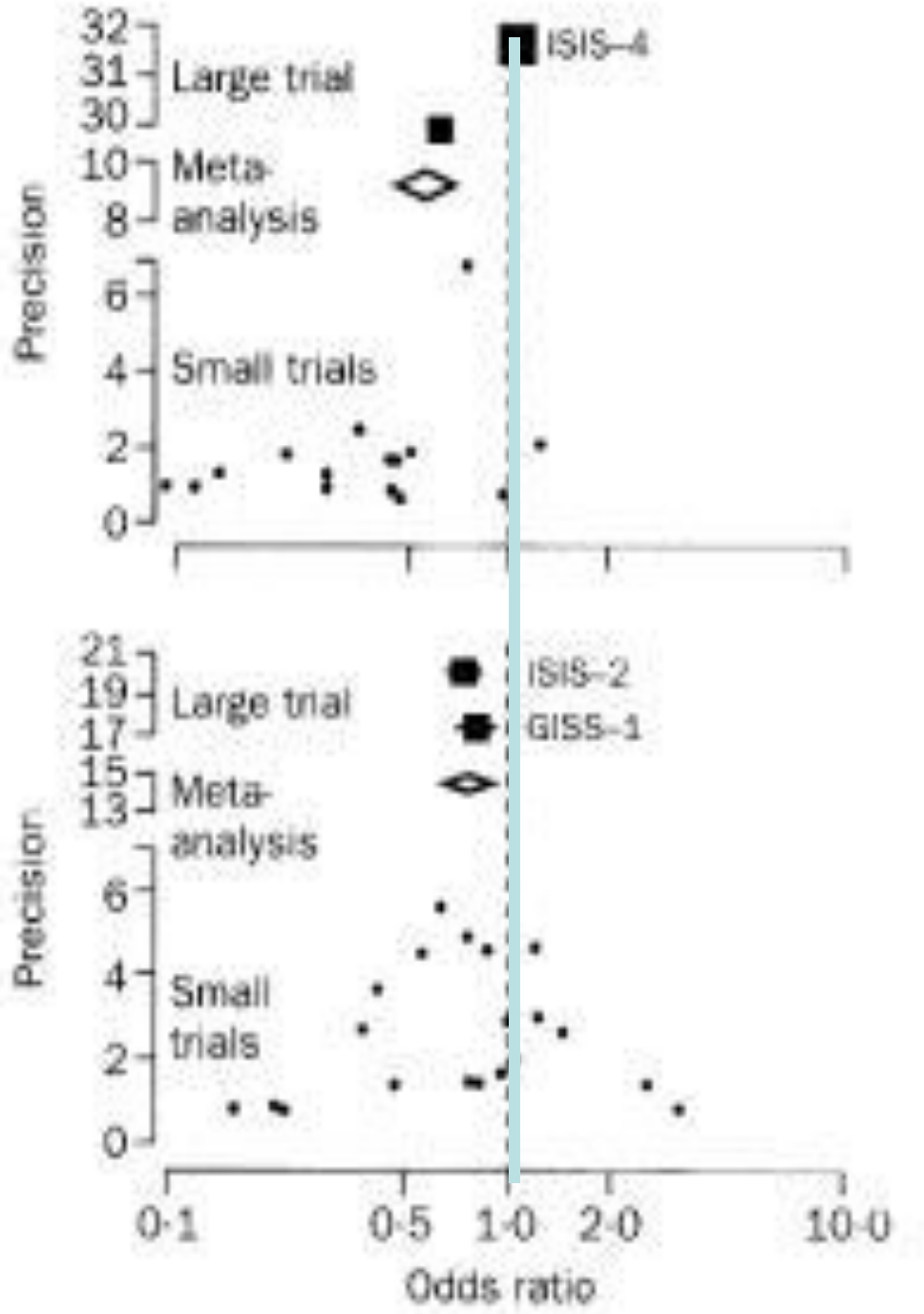
- Summarises all relevant research information about a common intervention
- Increased statistical power to detect small and important differences
- Analyse variability of effects among different patient subgroups
- Examine the distribution of effects across studies

Limitations

- Quality and validity of overall estimate is dependent on the quality of each individual study
- Diseases/treatments/participants must be similar enough to be combined
- A single highly ‘unusual’ result may significantly affect the overall estimate

Limitations II

- Need to weight studies according to quality (some subjectivity in this)
- Very time consuming
- Labour intensive
- Not available for every question you have!



Smith, Lancet 350 (9085) p1182

Disadvantages as a tool

- Generally only one of many possible interventions considered
- Often insufficient data about potential harms
- Hard to apply results to individuals with other co-morbidities

Sources of bias in reviews

- Publication
- Time lag
- Language
- Multiple publications
- Outcome reporting
- Citation

Is this the review for you?

- Is this a systematic review of randomised trials of the treatment you are interested in?
  - Go for the ‘gold standard’ whenever possible

- Does it include a methods section that describes:
  - Finding and including all relevant trials
  - Assessing their individual validity?
- Were the results consistent from study to study?

Where to find them?

Cochrane library

http://www.cochrane.org/

BMJ books

Medline

St John's wort for major depression

Linde K, Berner MM, Kriston L

Plain Language Summary

St. John's wort for treating depression.

Depression is characterised by depressed mood and/or loss of interest or pleasure in nearly all activities and a variety of other symptoms for periods longer than two weeks. Extracts of St. John's wort (botanical name *Hypericum perforatum L.*) are prescribed widely for the treatment of depression.

We have reviewed 29 studies in 5489 patients with depression that compared treatment with extracts of St. John's wort for 4 to 12 weeks with placebo treatment or standard antidepressants. The studies came from a variety of countries, tested several different St. John's wort extracts, and mostly included patients suffering from mild to moderately severe symptoms. Overall, the St. John's wort extracts tested in the trials were superior to placebo, similarly effective as standard antidepressants, and had fewer side effects than standard antidepressants. However, findings were more favourable to St. John's wort extracts in studies form German-speaking countries where these products have a long tradition and are often prescribed by physicians, while in studies from other countries St.

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Patients suffering from depressive symptoms who wish to use a St. John's wort product should consult a health professional. Using a St. John's wort extract might be justified, but important issues should be taken into account: St. John's wort products available on the market vary to a great extent. The results of this review apply only to the preparations tested in the studies included, and possibly to extracts with similar characteristics. Side effects of St. John's wort extracts are usually minor and uncommon. However, the effects of other drugs might be significantly compromised.

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Abstract

Background

In some countries extracts of the plant *Hypericum perforatum* L. (popularly called St. John's wort) are widely used for treating patients with depressive symptoms.

Objectives

To investigate whether extracts of hypericum are more effective than placebo and as effective as standard antidepressants in the treatment of major depression; and whether they have fewer adverse effects than standard antidepressant drugs.

Search strategy

Trials were searched in computerised databases, by checking bibliographies of relevant articles, and by contacting manufacturers and researchers.

Selection criteria

Trials were included if they: (1) were randomised and double-blind; (2) included patients with major depression; (3) compared extracts of St. John's wort with placebo or standard antidepressants; (4) included clinical outcomes assessing depressive symptoms.

Data collection and analysis

At least two independent reviewers extracted information from study reports. The main outcome measure for assessing effectiveness was the responder rate ratio (the relative risk of having a response to treatment). The main outcome measure for adverse effects was the number of patients dropping out due to adverse effects.

Acupuncture for shoulder pain

Green S, Buchbinder R, Hetrick SE

Plain Language Summary

Acupuncture for shoulder pain

Does acupuncture work for treating shoulder pain?
To answer this question, scientists found and analyzed 9 research studies. The studies tested over 500 people who had shoulder pain. People had either acupuncture, a placebo (fake therapy), ultrasound, gentle movement or exercises usually for 20-30 minutes, two to three times a week for 3 to 6 weeks. Even though the studies were small and not of the highest quality, this Cochrane review provides the best evidence we have today.

What causes shoulder pain and how can acupuncture help?
Shoulder pain can be caused by a number of different conditions. It can be caused by rotator cuff disease, periarthritis or adhesive capsulitis (frozen shoulder). Shoulder pain can sometimes go away on its own but may last up to 12 to 18 months. Drug and non-drug treatments are used to relieve pain and/or swelling. Acupuncture is a non-drug therapy being used more and more to treat shoulder pain. It is thought that acupuncture works either by releasing chemical compounds in the body that relieve pain, by overriding pain signals in the nerves or by allowing energy (Qi) or blood to flow freely through the body. It is not known whether acupuncture works or is safe.

How well does acupuncture work?
The improvements with acupuncture for pain and function were about the same as the effects of receiving a fake therapy for 2 to 4 weeks.

One study showed that acupuncture improved shoulder function more than fake therapy after 4 weeks. But after 4 months

News & Events
Current news
Cochrane Opportunities/jobs
Other opportunities/jobs
Cochrane Collaboration Calendar
Colloquia
Select evidence-based health care events
Workshops
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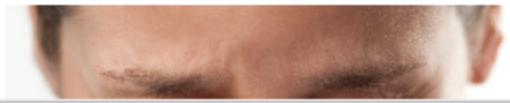
Widespread media coverage for the Cochrane Review of zinc for the common cold

"There used to be a lot of education needed on what a review is and what Cochrane is, but now this is asked less and less, and the media take press releases seriously because they see it's a Cochrane Review." **Jen Beal**, Global Publicity Manager, Wiley-Blackwell

The February 2011 issue of *The Cochrane Library* included, as usual, about 30 new reviews, covering a wide range of subjects. Two of those reviews, on zinc for the common cold and on biologic drugs for arthritis, looked like they might be of interest to the media, so *The Cochrane Library's* publisher, John Wiley & Sons, issued press releases. Important though the arthritis review may be, it was the zinc review that caused a stir.



The review, by researchers from the Post Graduate Institute of Medical Education and Research, in Chandigarh, India, found that taking zinc significantly reduced the duration of symptoms of the