Research synthesis

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What is research synthesis?

- The process through which two or more research studies are assessed with the objective of summarizing the evidence relating to a particular question.

Why do we need research synthesis?

- To make sense of current research (science is cumulative)
  - volume of research is overwhelming
  - access to reports of research is haphazard, and often biased
  - the quality of research is very variable
  - most studies are too small

Why is research synthesis important?

- Patients (and the public more generally) suffer directly and indirectly
- Policymakers, practitioners, and patients have inadequate information to guide their choices among alternatives
- Limited resources for health care and new research are used inefficiently

Research synthesis is required for which types of research?

- *Basic science research:* Horn J et al. Nimodipine in animal model experiments of focal cerebral ischaemia. **Stroke 2001**
- *Risk factors:* Factors predisposing women to chronic pelvic pain: systematic review. Latthe P, Mignini L, Gray R, Hills R, Khan K. **BMJ 2006**
- *Aetiology:* Mignini L, Villar J, Khan K. Mapping the theories of preeclampsia: the need for systematic reviews of mechanisms of the disease. **AJOG 2006**
- *Screening/diagnostic tests:* Selman TJ, Luesley DM, Acheson N, Khan KS, Mann CH. A systematic review of the accuracy of diagnostic tests for inguinal lymph node status in vulvar cancer. **Gynecol Oncol. 2005**
- *Prevalence/incidence studies:* Say L, Donner A, Gülmezoglu AM, Taljaard M, Piaggio G. The prevalence of stillbirths: a systematic review. **Reproductive Health 2006**
- *Effects of practices:* Hofmeyr GJ, Walraven G, Gülmezoglu AM, Maholwana B, Alfirevic Z, Villar J.*Misoprostol to treat postpartum haemorrhage: a systematic review.* **BJOG 2005**

The science of research synthesis

- Systematic reviews
  - protocol development
  - critical appraisal
  - meta-analysis
- Updating/electronic publication

What is a systematic review?

- A review of a clearly formulated question that uses systematic and explicit methods to identify, select and critically appraise relevant research, and to collect and analyse data from the studies that are included in the review.
- Statistical methods (meta-analysis) may or may not be used to analyse and summarise the results of the included studies.

What constitutes a systematic review?

- Clearly formulated question
- Methods to identify studies (searching)
- Selecting studies
- Critical appraisal

Review protocol

- Systematic reviews are research projects
- Systematic reviews are retrospective studies
- Protocol preparation allows ‘a priori’ decisions
- To obtain feedback and criticism for the review before it is finalised

Sections of a protocol

- Cover sheet
- Background
- Objectives
- Selection criteria
- Search strategy
- Methods

Selection criteria

- Types of studies
  - RCTs, placebo-controlled etc.
- Participants
  - sex, age groups, community vs hospital
- Interventions
  - Treatment vs nothing? Placebo?
  - Treatment vs another treatment
- Outcomes
  - Substantive outcomes vs surrogate outcomes
  - Outcomes important for decision-making
  - Outcomes important for users (consumers)

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Search strategy

- search terms
- databases
- handsearching

- expert help usually needed

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Methods

- How will you decide to include or exclude a study from the review (critical appraisal)?
  - A priori description
  - Duplicate assessments
  - Quality assessment
  - Missing data

Sections of a systematic review

- Cover sheet
- Background
- Objectives
- Selection criteria
- Search strategy
- Methods
- Description of studies
- Methodological quality of included studies
- Results
- Discussion
- Conclusions
  - Implications for practice
  - Implications for research
- Acknowledgements
- Conflict of interest

What is a meta-analysis?

- The use of statistical techniques in a systematic review to integrate the results of the included studies. Also used to refer to systematic reviews that use meta-analysis.

1977

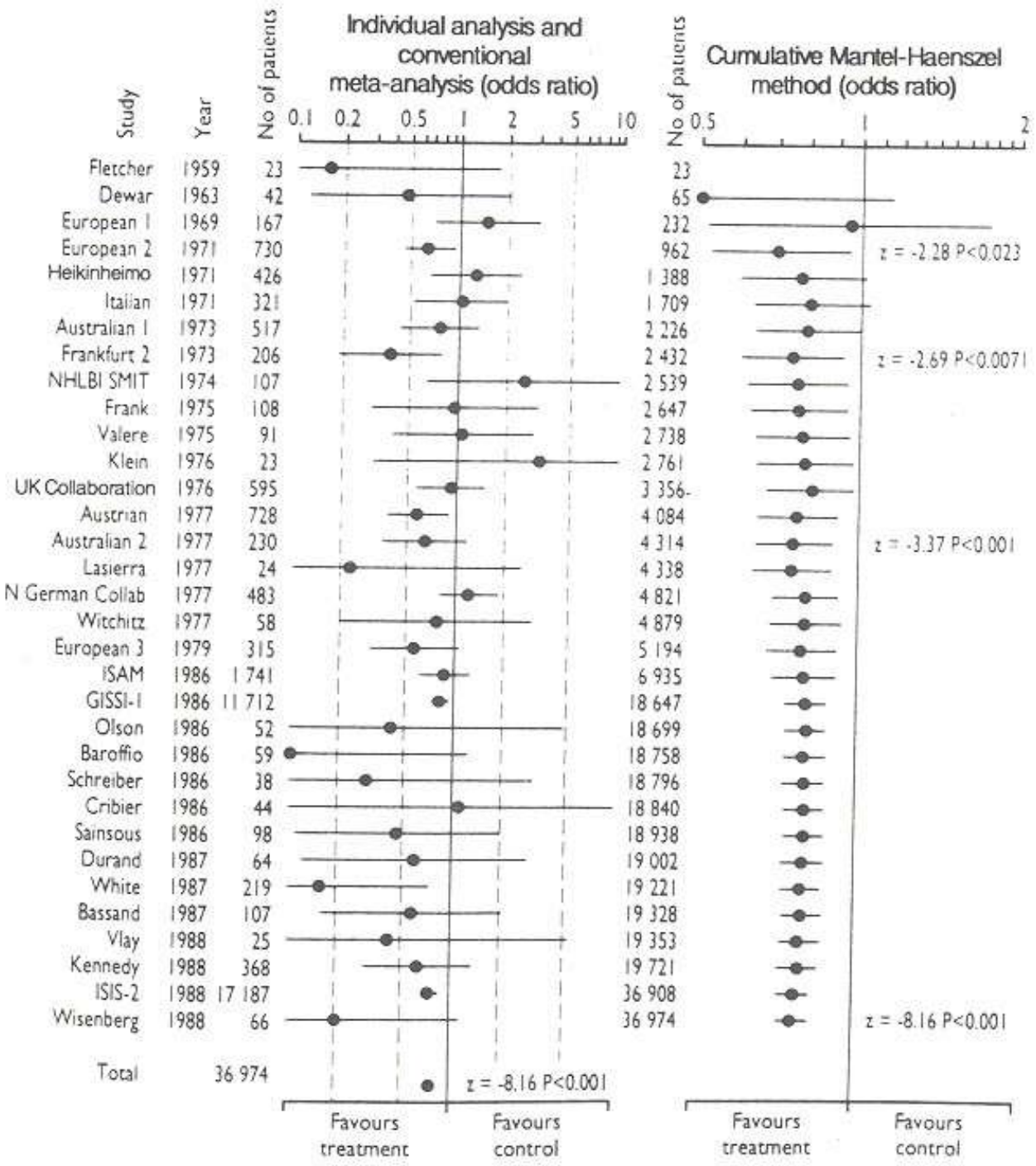


Figure 1.1 Conventional and cumulative meta-analysis of 33 trials of intravenous

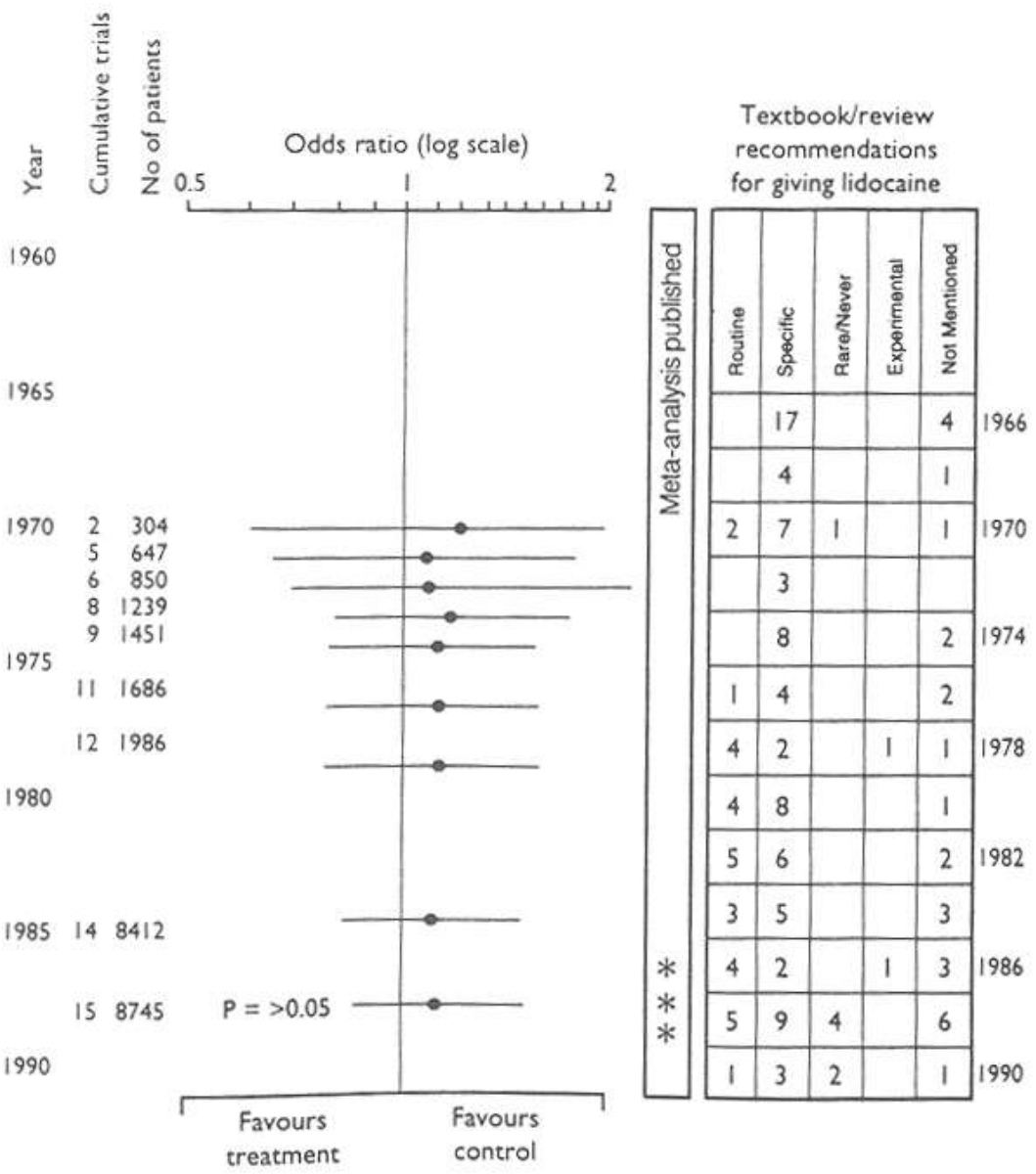
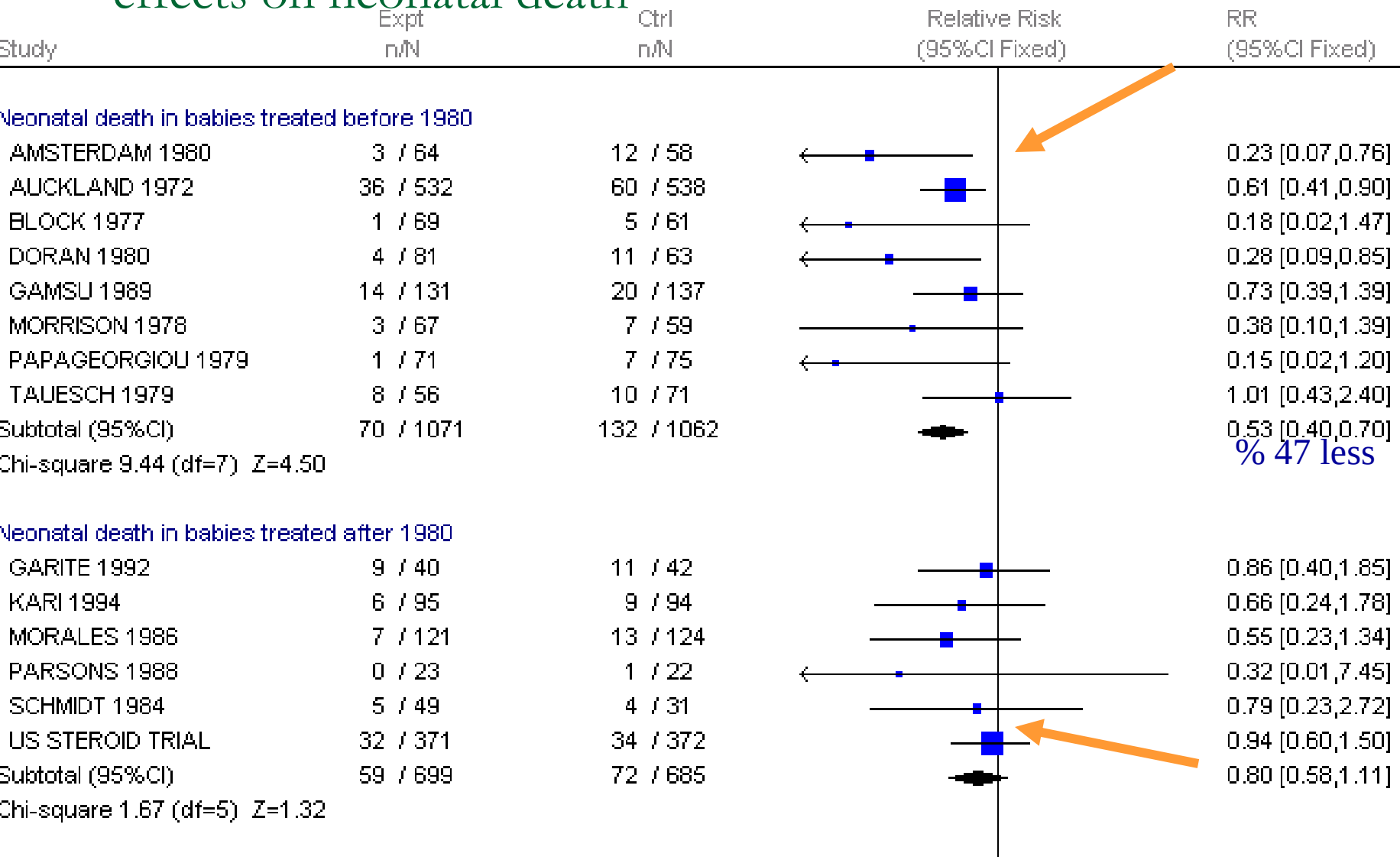


Figure 1.3 Cumulative meta-analysis by year of publication or randomised controlled trials of prophylactic lidocaine for acute myocardial infarction, and recommendations of clinical expert reviewers (adapted from Antman *et al*[14])

Corticosteroid treatment for women in preterm labour: effects on neonatal death



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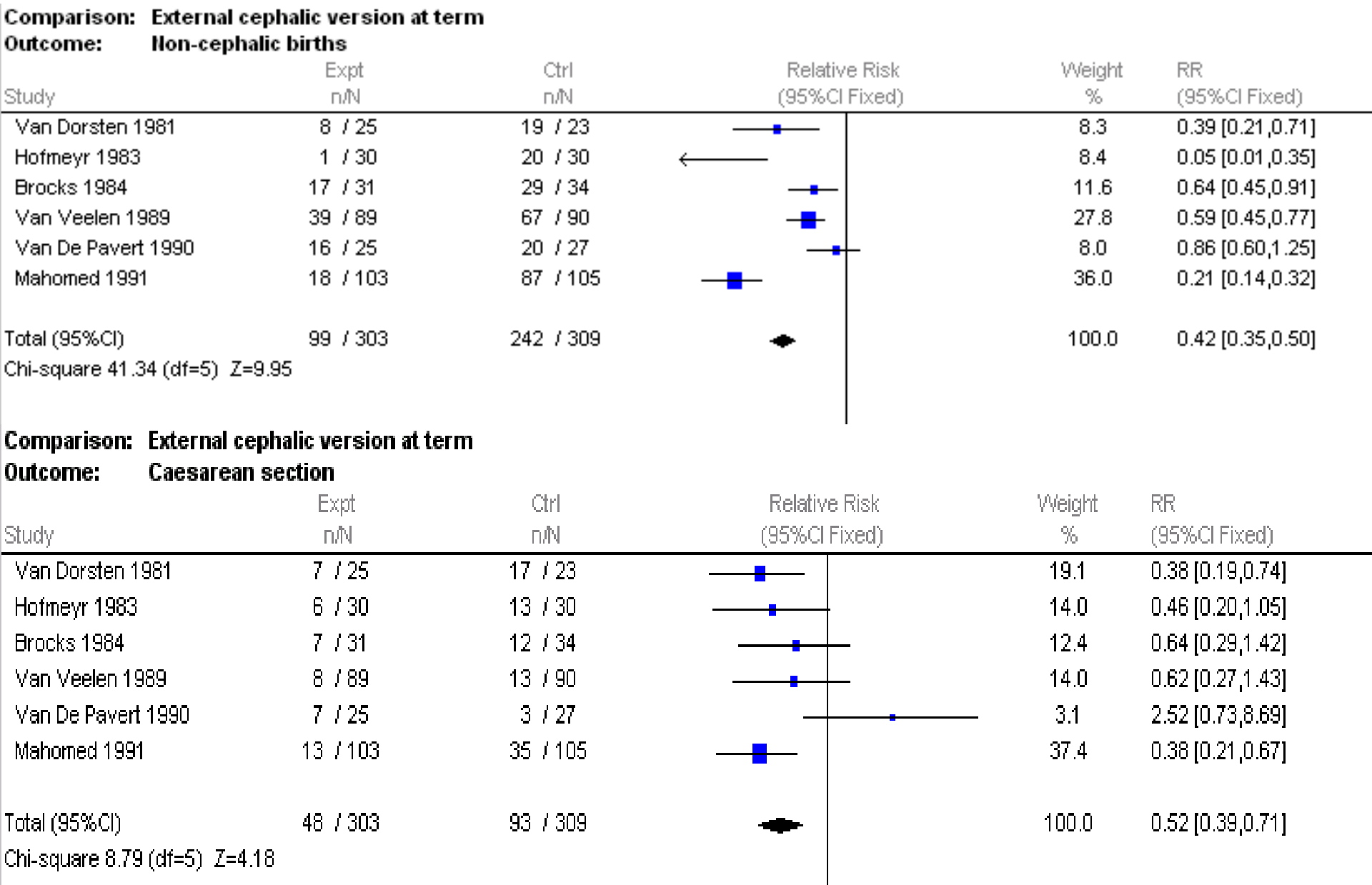

Conclusions

- Research synthesis is an essential component of decision-making for
  - Research
  - Practice
  - Policy

Useful resources

- WHO Reproductive Health Library (http://www.who.int/rhl)
- Cochrane Collaboration web site (http://www.cochrane.org)
- Netting the evidence: (http://www.shef.ac.uk/~scharr/ir/netting/)