



Evidence Based Dentistry

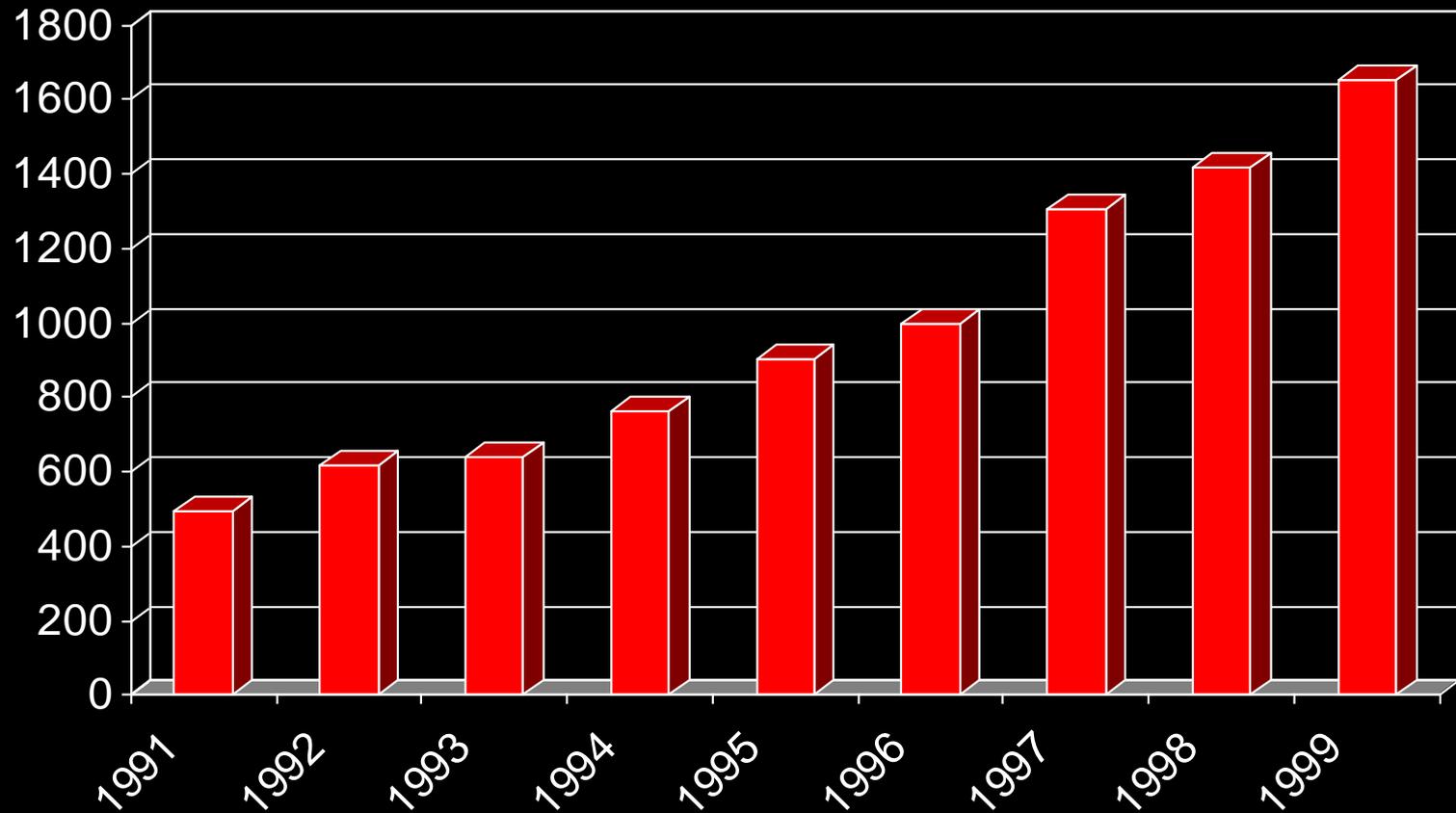
Quality of review articles

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The Review article

- An attempt to synthesise the results and conclusions of two or more publications on a given topic
- Editorials, working papers etc.

Systematic Reviews in Medline



Reviews by any other name...

overview

review

consensus statement

editorial

report

systematic review

comment

appraisal

guidelines

analysis

working paper

meta-analysis

Reasons to read and use reviews

- Sheer volume of literature
- Save time doing exhaustive literature researches
- Minimise publication bias
- BUT - problems exist

The Review

- Usually
 - written by a single topic expert
 - based on their understanding of literature
 - no methodology given
 - usually broad based subject addressed

Limitations of the narrative review

- Personal Bias
- Selection Bias
- Cannot be reproduced independently
- Cannot easily check assumptions

Limitations of the narrative review: example: the common cold

- Paulin L. How to live longer and feel better. 1986.
 - 30 trials all showing a positive effect on the common cold
- Kleijnen et al. 1989.
 - Medline search - 22 trials
 - References - 15 additional trials
 - References of references - 9 more
 - Final check found 1 further study
 - 47 in total

Vitamin C and the common cold

- Pauling
 - Catching a cold and letting it run its course is a sign that you are not taking enough vitamin C
- Kleijnen et al
 - Even in gram quantities per day Vitamin C cannot prevent a cold
 - However if you already have a cold it may slightly decrease the duration and severity of your cold

Pitfalls of reviews

- Mulrow CD (1987). The medical review article: state of the science. *Ann Int Med* 106;485-8.

Current medical reviews do not routinely use scientific methods to identify, assess, and synthesize information.

- Yusuf S et al. (1987). Proceedings of methodologic issues in overviews of randomized clinical trials. *Stat Med* 6;217-409.

The scientific quality of healthcare review articles is poor

Pitfalls of reviews

- Antman EM et al. (1992). A comparison of results of meta-analyses of RCTs and recommendations of clinical experts. JAMA 268:240-8

Unsystematically reviews have some times taken more than a decade to recommend treatments that a systematic review would have shown to prevent premature death, other treatments have been endorsed long after evidence from trials have suggested that they were useless or actually harmful

- Oxman A, Guyatt GH (1993). The science of reviewing research. Ann NY Acad Sci 703;125-34.

The traditional review article is both non-reproducible and, as a scientific exercise, of low mean scientific quality.

Review articles: what is needed?

- better reviews

- quality
- reliable
- relevant

Scientific rather than subjective summarization of literature

- improved access to reviews

- readers more skilled in making sense of reviews

One solution: Systematic Review/ Overview

A review that strives to comprehensively identify and track down all the literature on a topic

Structured process involving several steps:

Well Formulated Question

Comprehensive Data Search

Unbiased Selection and Abstraction Process

Critical Appraisal of Data

Synthesis of Data

Example: Cochrane Collaboration

Cochrane Review

- Formulating the problem
- Locating and selecting studies
- Quality assessment of studies
- Collecting data
- Analysing and presenting results
- Interpreting results
- Improving and updating reviews

Key Stages in a Systematic Review

- Specify objectives
- Report all relevant primary studies
- Assess methodological quality
- Identify common definitions for outcomes
- Extract estimates of outcomes
- Meta-analysis where appropriate
- Narrative summary where data sparse or of too low quality
- Explore robustness of results
- Clear presentation of key aspects
- Appraisal of methodological limitations of primary studies and systematic review.

Advantages of Systematic Reviews

- Reduce quantity of data
- Plan research, purchasing and guidelines
- Make efficient use of existing data
- Ensure generalisability
- Check consistency
- Explain inconsistency
- Quantify with meta-analysis
- Improve precision
- Reduce bias

Meta-analysis

A specific statistical strategy for assembling all the results of several studies into a single numerical estimate

Meta-analysis

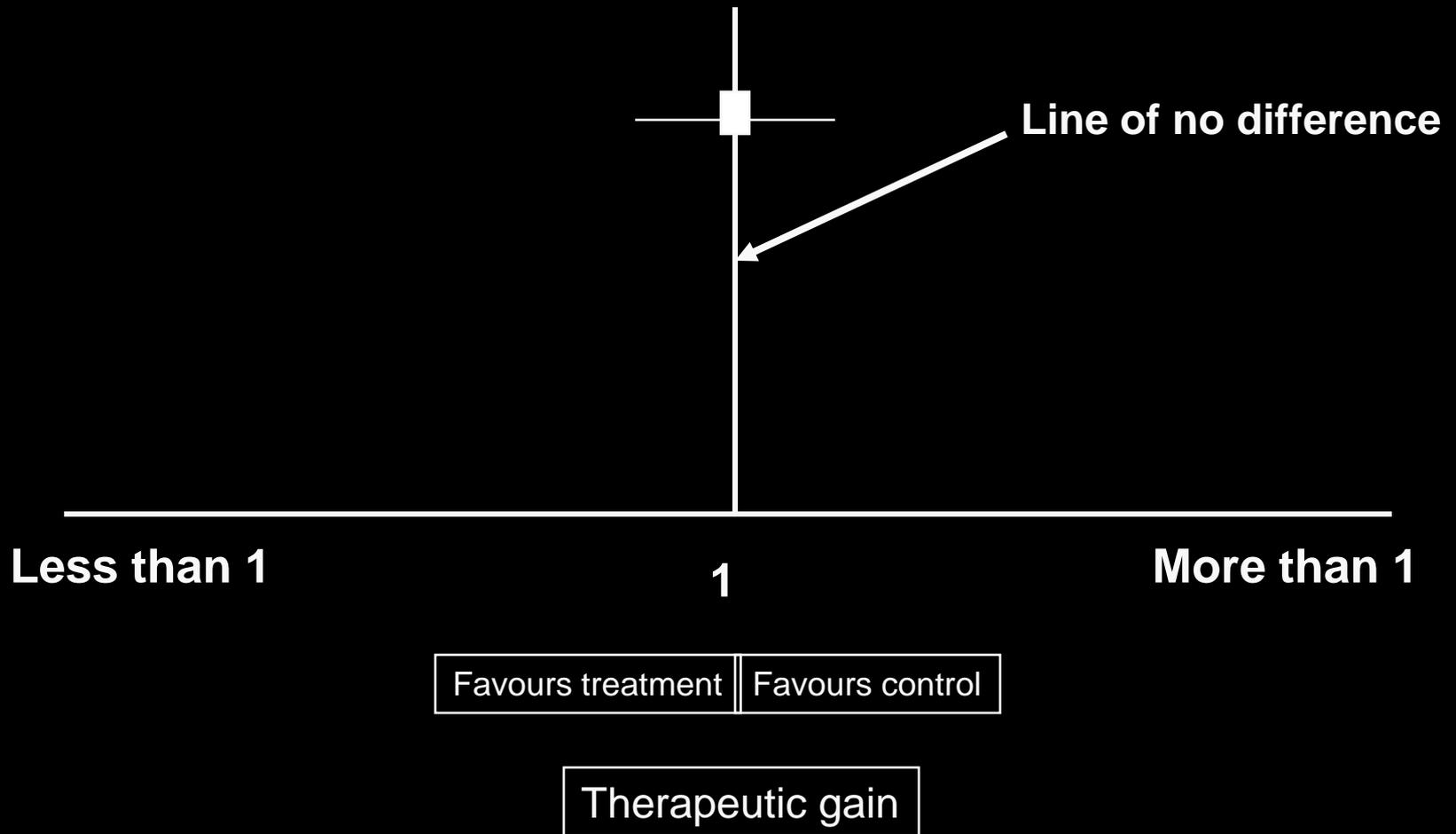
- An overview with a specific statistical technique which summarizes the results of several studies into a single estimate
- Weights studies according to their size
- Bias is more important than complex statistics in reading meta-analyses critically

Reviews

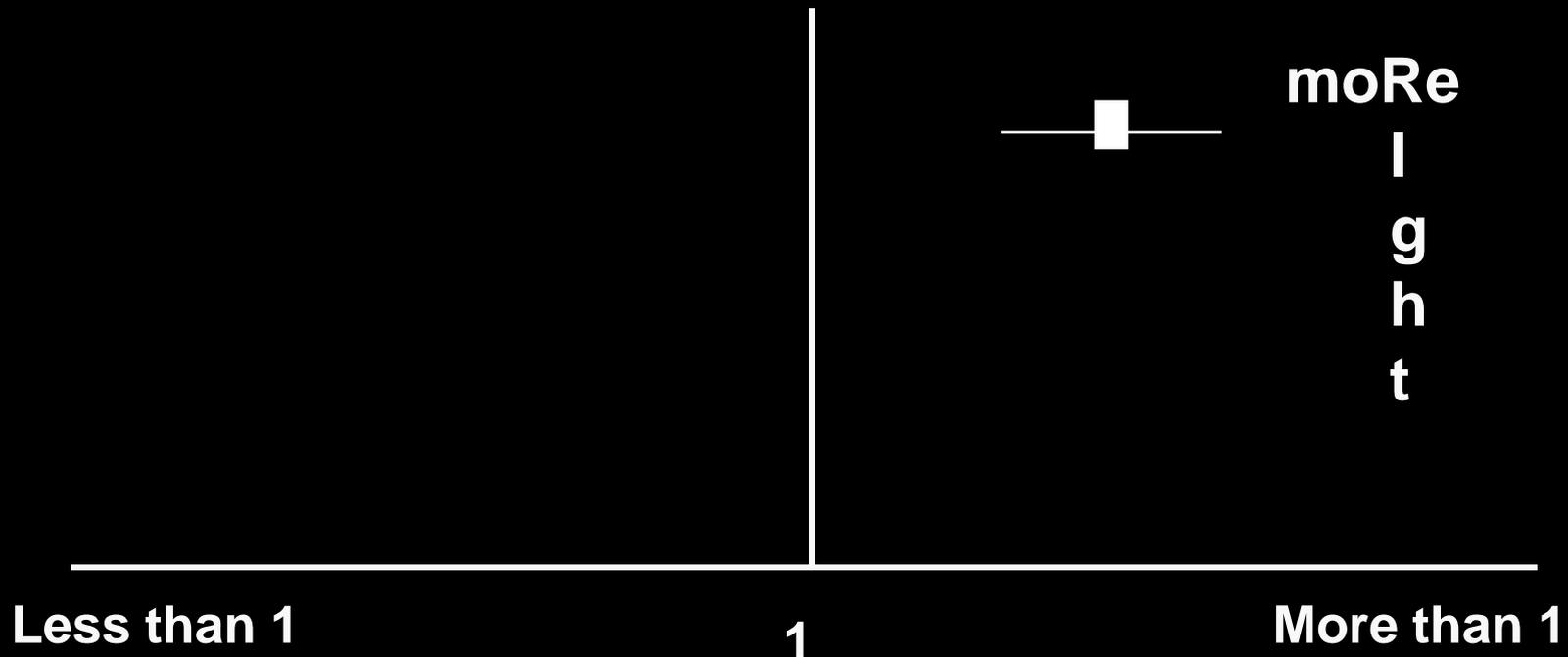
Systematic
Reviews

Meta-analyses

Odds Ratio



Odds Ratio



If you want **more** of something to happen, such as greater reduction in new cavities and the experimental intervention is successful

the results will show in the **right-hand side**

Odds Ratio

Less
e
f
t



Less than 1

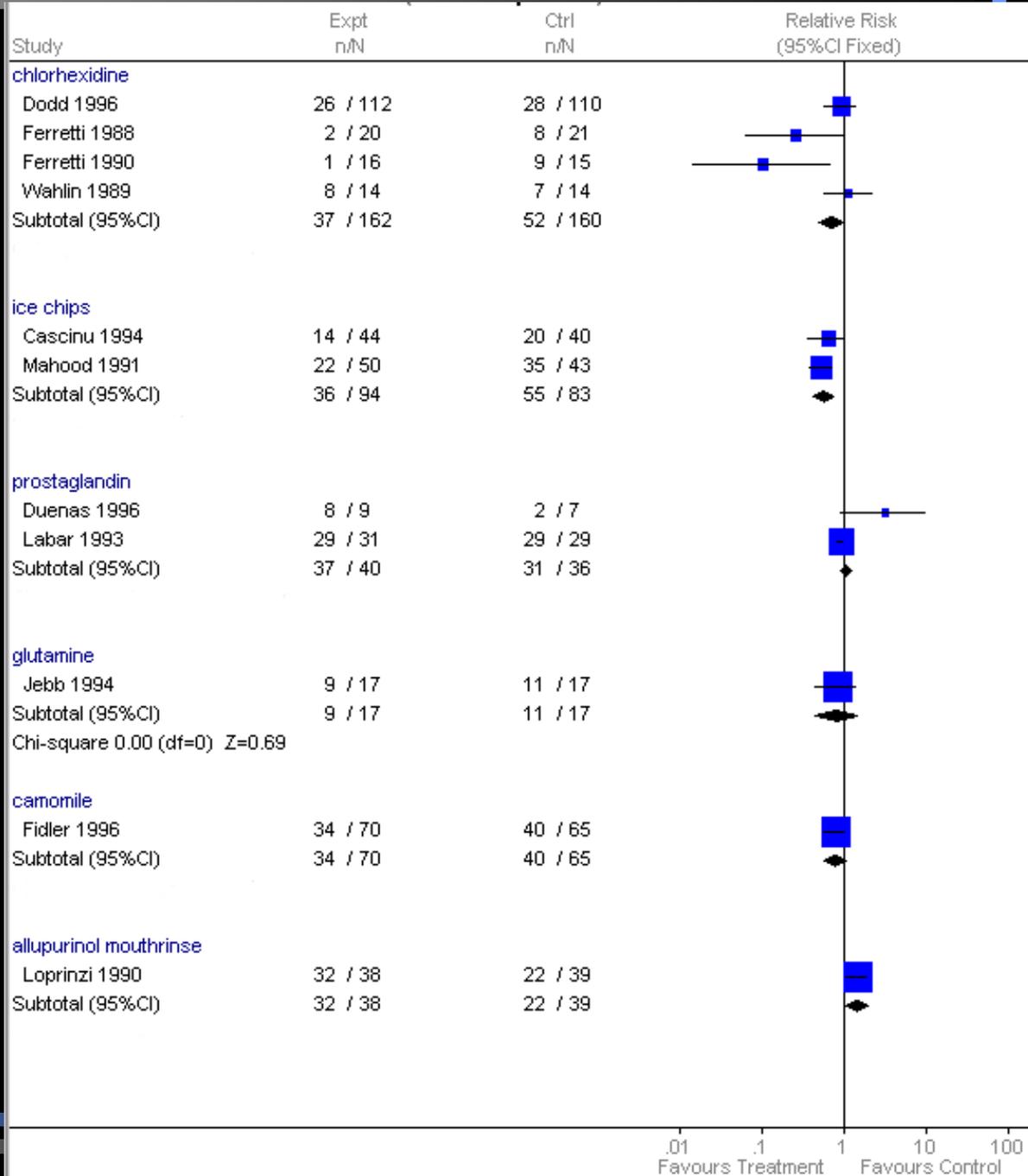
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More than 1

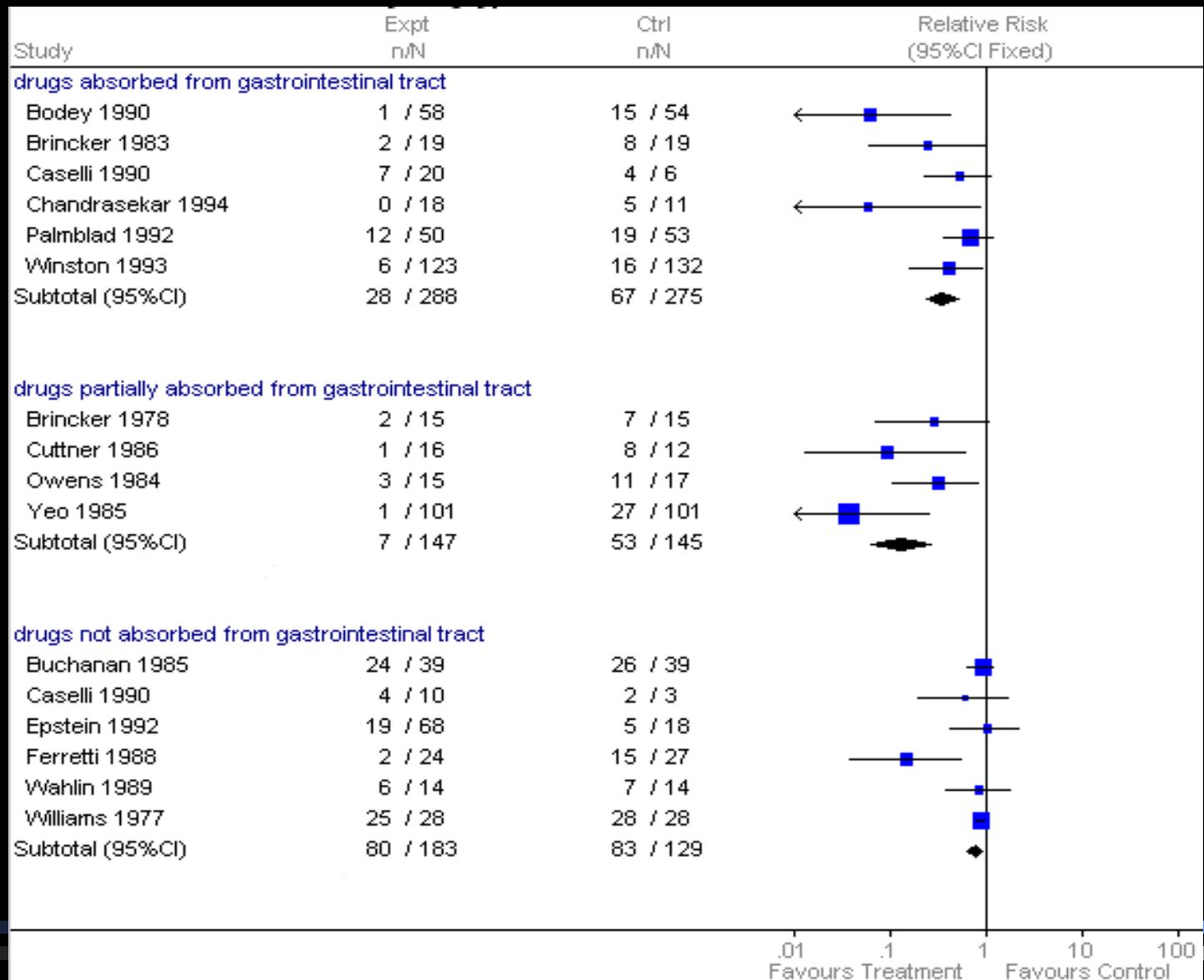
If you want **less** of something to happen, e.g less swelling following a minor surgical procedure if you prescribe a particular tablet and the experimental intervention is successful

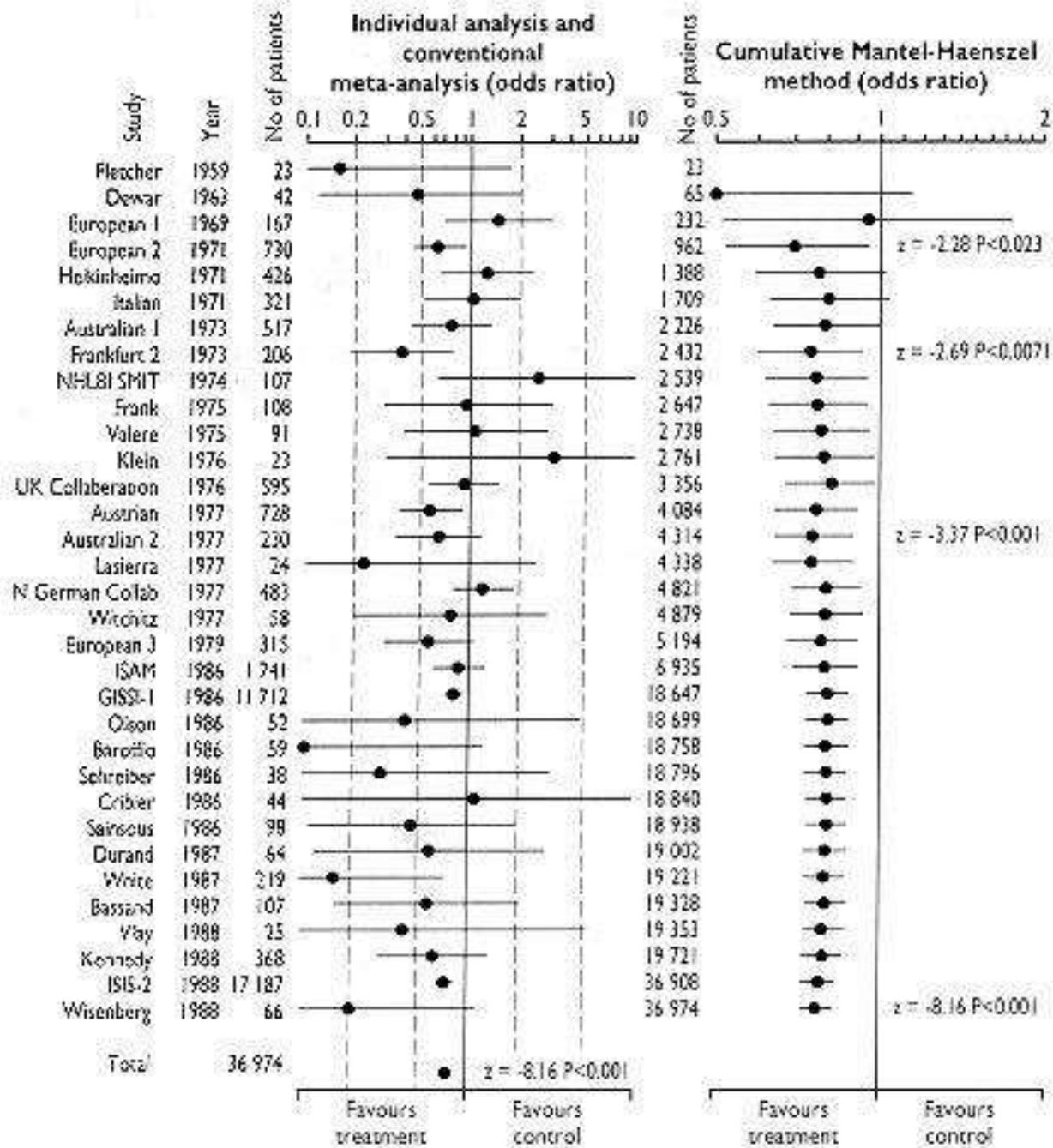
the results will show in the **left-hand side**

Clarkson I,
 Worthington H.
 Prevention and
 treatment of oral
 mucositis and oral
 candidiasis for
 patients with
 cancer



Clarkson I, Worthington H. Prevention and treatment of oral mucositis and oral candidiasis for patients with cancer

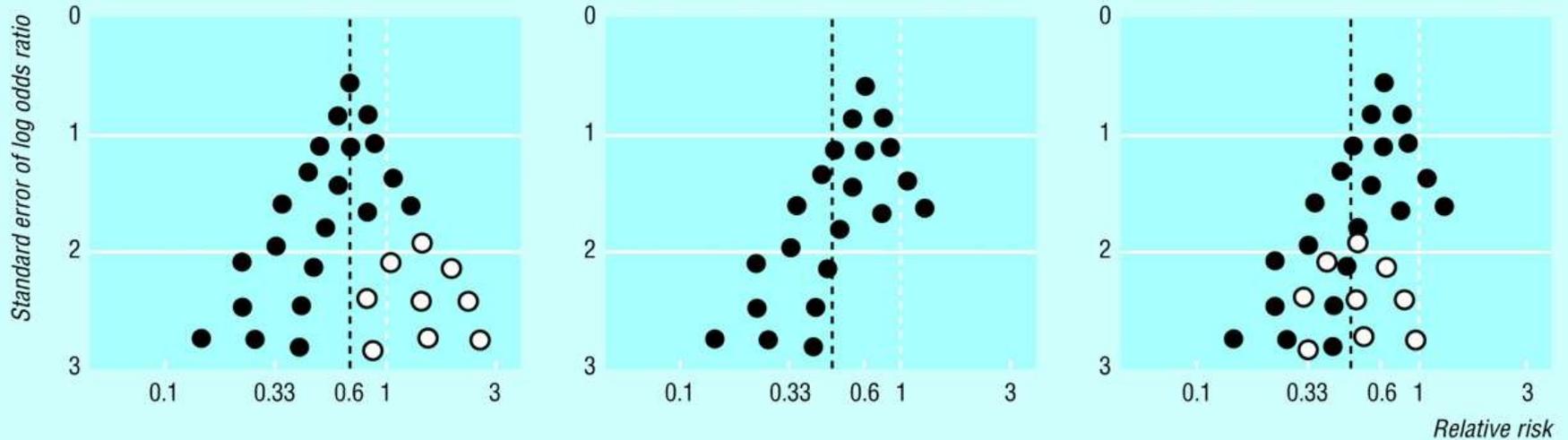




Dangers of Systematic Reviews

- Publication bias
 - Unpublished data
 - Covert duplicate publications
 - Limitation to positive findings
 - Language bias
 - Funding bias
- Study quality bias
- Retrieval bias - Form of “observational study”

Study Bias



Favours treatment

Favours control

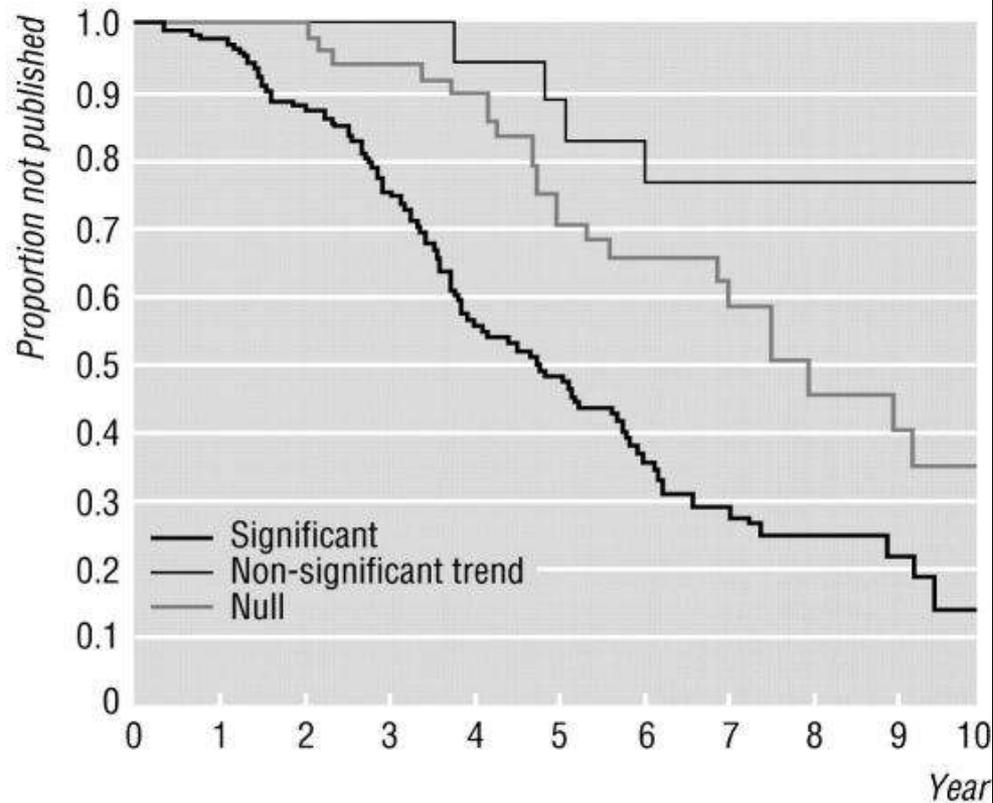
No bias

Publication Bias

Bias due to poor methodology

Reasons for Not Publishing

<u>Reasons</u>	<u>%</u>
Manuscript in the system” or published elsewhere	19
Non-significant results	15
Publication not aim of study	13
Incomplete analysis	11
Rejected manuscript	9
Too busy	9
Unimportant results	6
Funding source has the data	5



No at risk						
Significant	144	127	77	36	15	2
Non-significant trend	20	20	19	14	4	3
Null	52	52	46	24	10	7

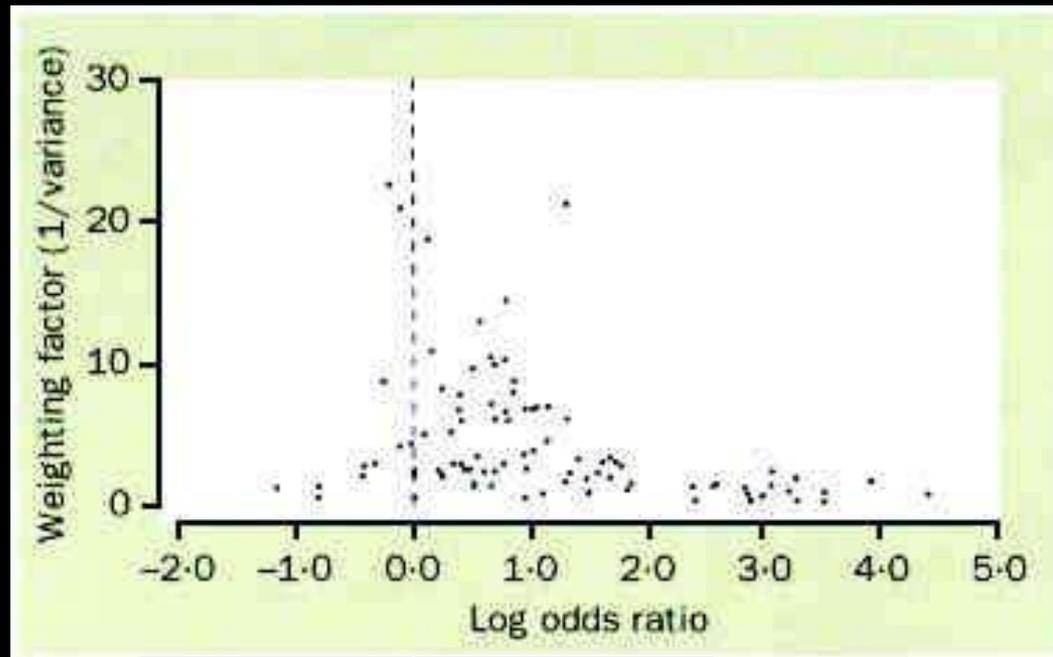
Stern JM, Simes RJ. Publication bias: evidence of delayed publication in a cohort study of clinical research projects. *BMJ* 1997; 315

Publication Bias

A tendency among investigators, peer reviewers and journal editors to allow the direction and statistical significance of research findings to influence decisions regarding submission and acceptance for publication.

Publication Bias

- Positive findings are published - regardless of size
- Negative findings less often published - especially if study is small



Favours control Favours treatment

Funding Bias

Article Conclusion	No. (%) of Reviews	
	Tobacco-Affiliated Authors (n = 31)	Non-Tobacco-Affiliated Authors (n = 75)
Passive smoking harmful	2 (6)	65 (87)
Passive smoking not harmful	29 (94)	10 (13)
Significance	$\chi^2_1 = 60.69; P < .001$	

Barnes & Bero. Why review articles on health effects of passive smoking reach different conclusions. JAMA 1998.

Cho & Bero. The Quality of Drug Studies Published in Symposium Proceedings. Ann Int Med, 1996.

Outcome of Study	Studies Supported by a Drug Company (n = 40)	Studies Not Supported by a Drug Company (n = 112)
	n(%)	
Favorable	39 (98)	89 (79)
Not favorable	1 (2)	23 (21)

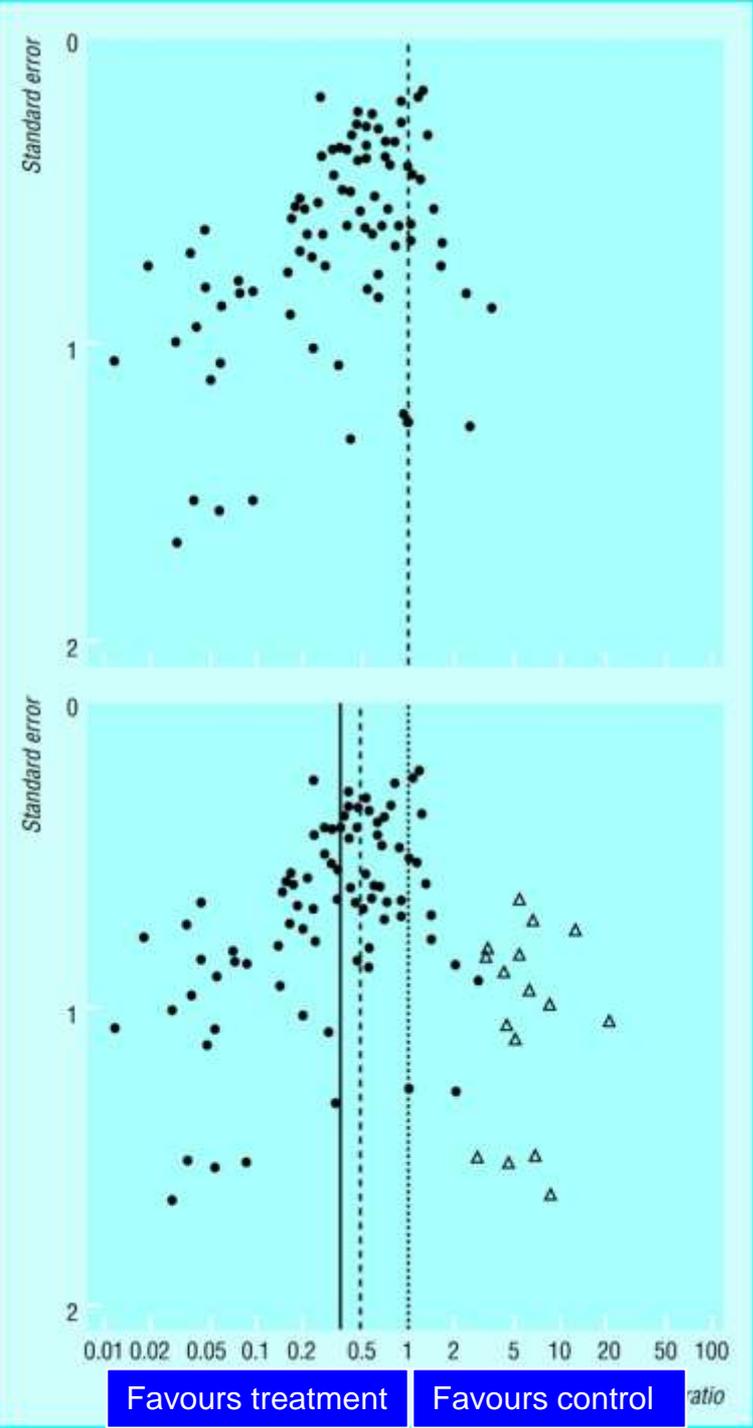
* The proportion of studies with favorable outcomes was significantly higher for studies supported by a drug company than for studies without drug company support ($P < 0.01$).

Why does study bias matter?

When bias leads to incorrect conclusions about the safety and efficacy of elements of clinical care, it raises not only scientific, but also ethical concerns.

Effects on meta-analytic averages

Linde et al. Homeopathic studies. Lancet 1997.



Retrieval Bias - What causes it?

- Selective reading
 - trials showing statistically significant differences more likely to be read in journals
- Selective indexing
- Selective citation
 - reports showing positive features of a drug or therapy are more likely to be cited than those casting doubt on its value or safety

Reviews: which to use?

“If one doesn’t have some guidelines for assessing the reviews from which these recommendations are taken, deciding which review to believe is like deciding which toothpaste to use. It is a question of taste rather than a question of science.”

Oxman and Guyatt, 1988

Questions when appraising a review

Three basic types of questions...

1. Is it trustworthy? – *Validity*
screening questions
detailed questions on methodology
2. What does it say? – *Results*
3. Will it help? – *Relevance*

Is this review valid?

1. Did the review address a clearly focused issue?

An issue can be focused in terms

- *the population studied*
- *the intervention given*
- *the outcomes considered*

2. Did the authors select the right sort of studies for review?

The right sort of studies would

- *address the review's question*
- *have an adequate study design*

Is this review valid?

3. Do you think the important, relevant studies were included?

look for

- *which bibliographic databases were used*
- *checks from reference lists*
- *personal contact with experts*
- *search for unpublished as well as published studies*
- *search for non-English language studies*

Is this review valid?

4. Did the review's authors do enough to assess the quality of the included studies?
5. Were the results similar from study to study?

Consider whether

- *the results of all the included studies are clearly displayed*
- *the results of the different studies are similar*
- *the reasons for any variations in results are discussed*

What are the results of this review?

6. What is the overall result of the review?

Consider

- *If you are clear about the review's bottom line results*
- *What these are (numerically if appropriate)*
- *What units these results are expressed in*

7. How precise are the results ?

- *Are there confidence limits?*
- *What are they?*

Is this review relevant for me?

8. Can the results be applied to the local population?

Do you think that the patients covered by the review are similar enough to your population?

9. Were all clinically important outcomes considered?

If not, does this affect the decision?

10. Are the benefits worth the harms and costs?