Publication and related biases

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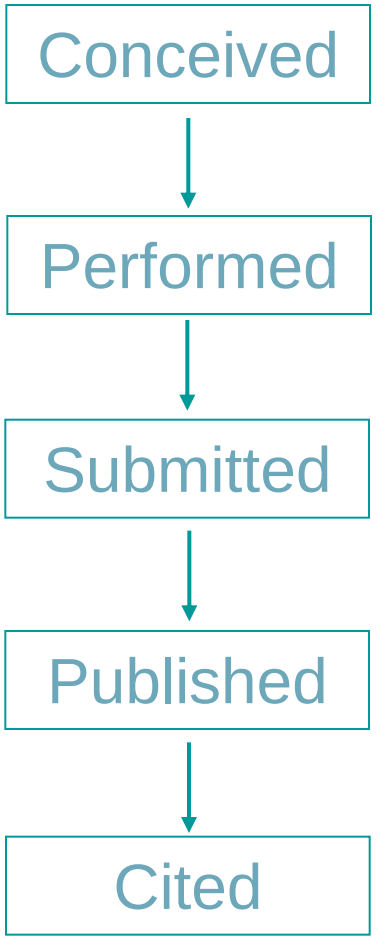
Outline

- opportunities for bias throughout conduct and reporting of a trial
- empirical evidence of publication/reporting bias
- detecting bias – funnel plots and statistical tests
- correcting bias
- preventing bias

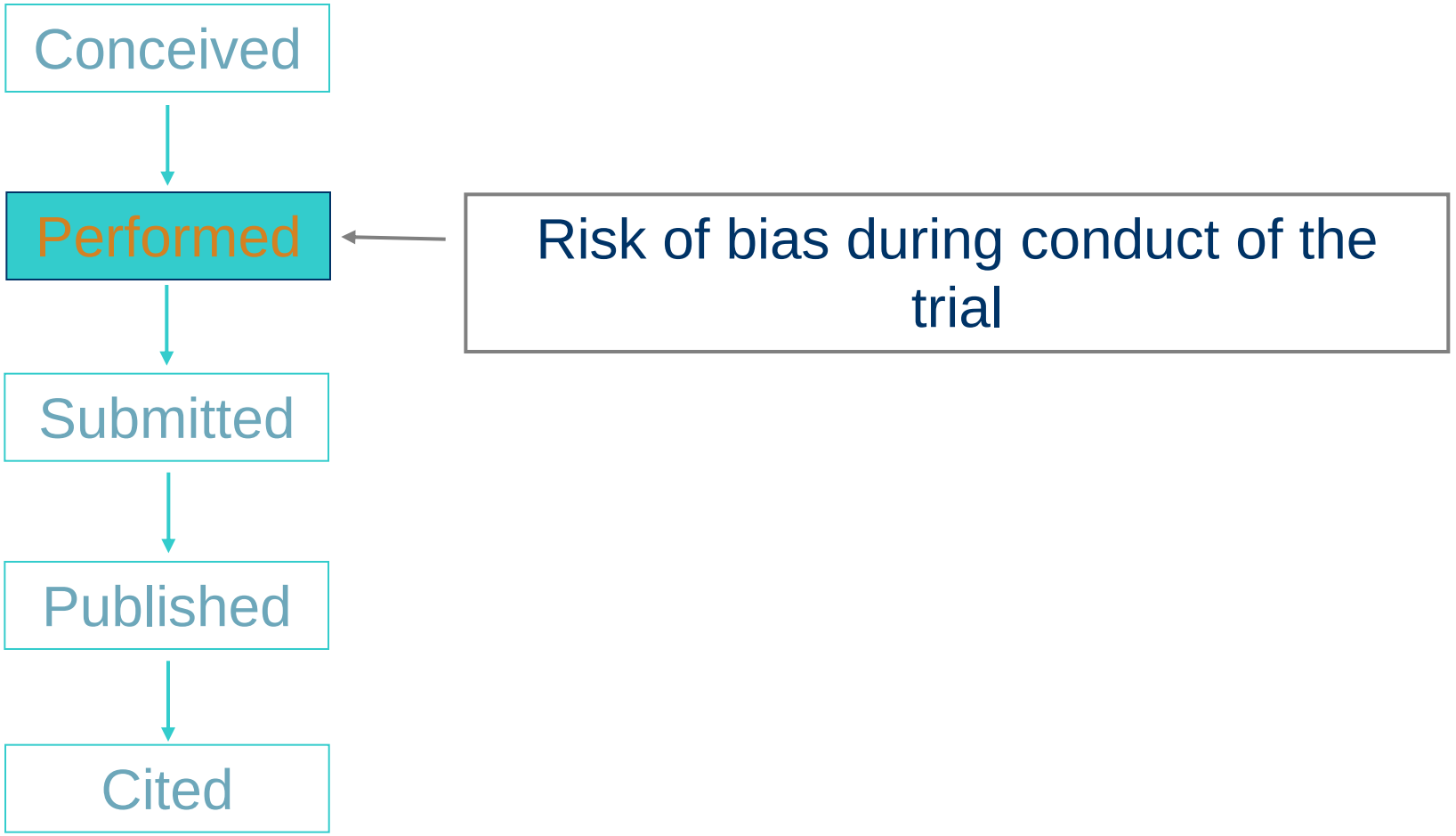
Trials and references



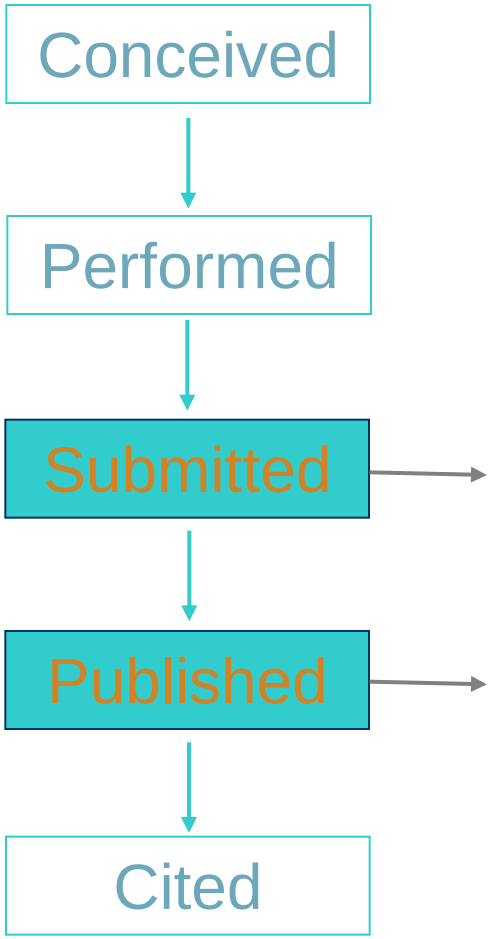
Stages of a trial and its findings

Trials and references

Trials and references



Trials and references



Because the results are exciting...
(publication bias)

…quickly?
(time-lag bias)

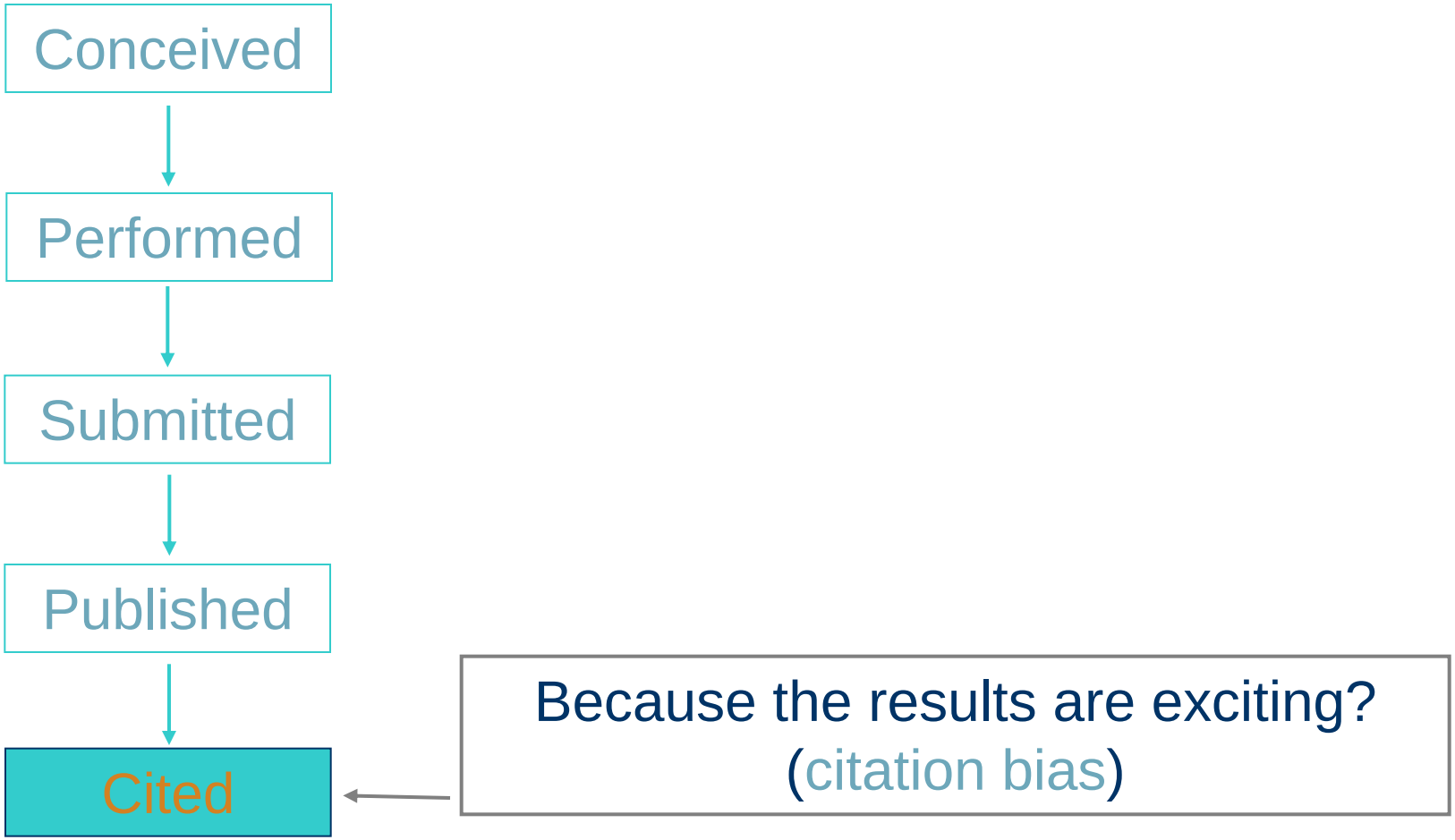
…published many times?
(duplicate/multiple publication bias)

…published in English journals?
(language bias)

…with only some outcomes?
(outcome reporting bias)

…to MEDLINE-indexed journals?
(database bias)

Trials and references



How do we estimate whether bias is there?

- check the methods of our review
- a test to show how likely it is that we have missed studies?

Dealing with publication bias in meta-analysis

Funnel plots

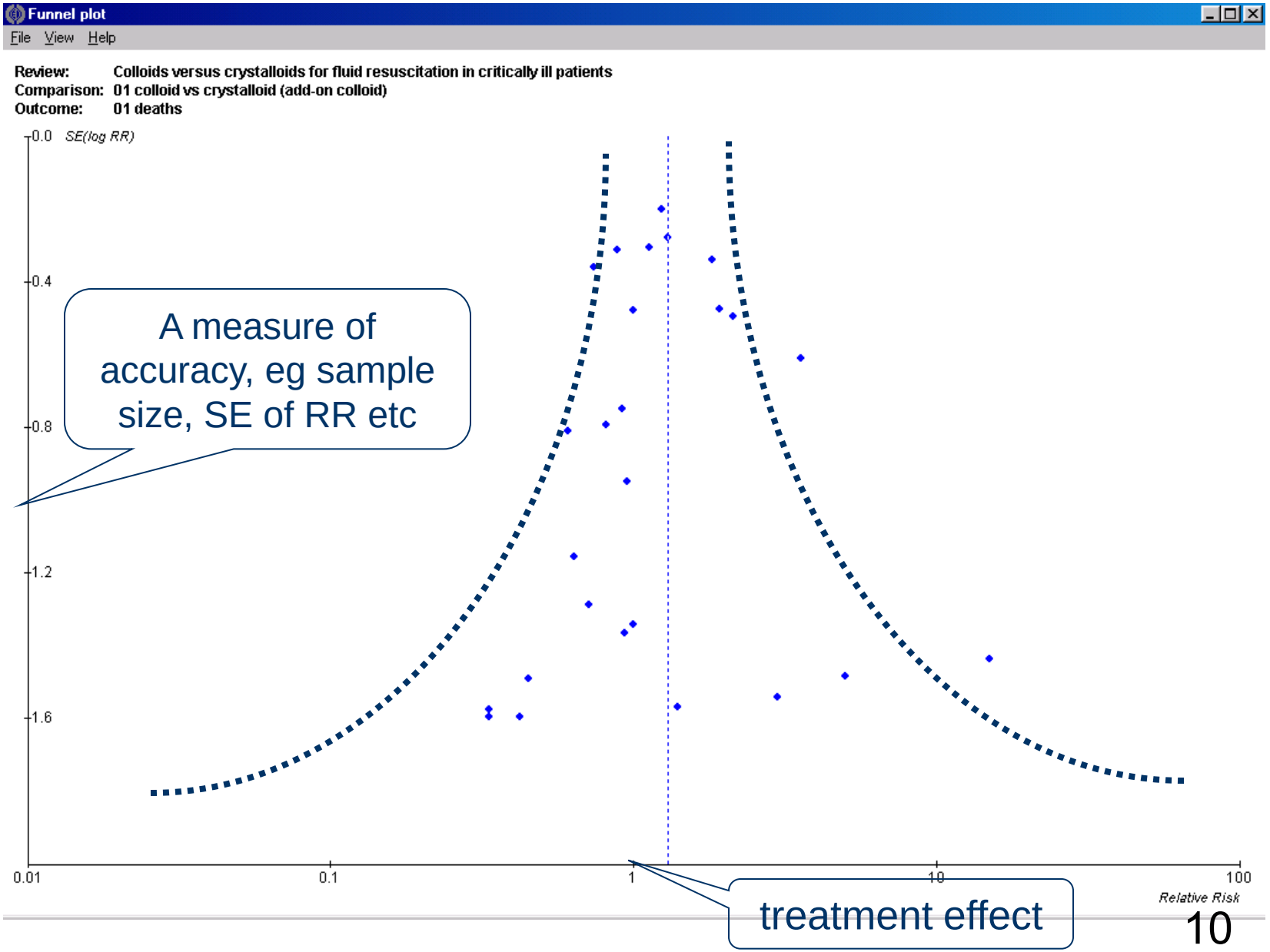
- most common method to estimate if bias exists
- if all studies have been located the resulting plot should represent an inverted funnel
- a plot of:

size of treatment effect (i.e. RR or OR on log scale on x-axis)

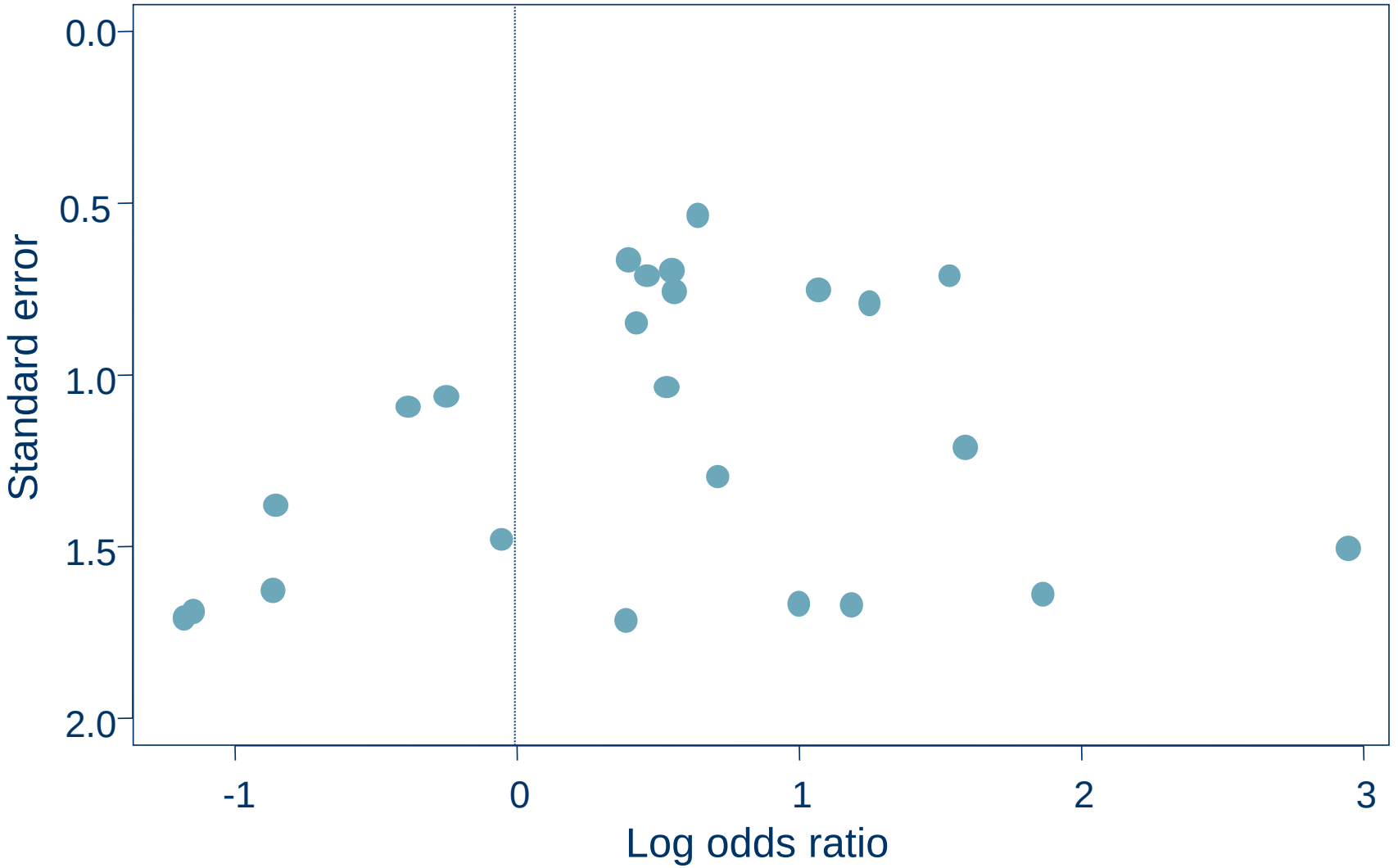
versus

a measure of precision (i.e. SE, sample size, variance on y-axis)

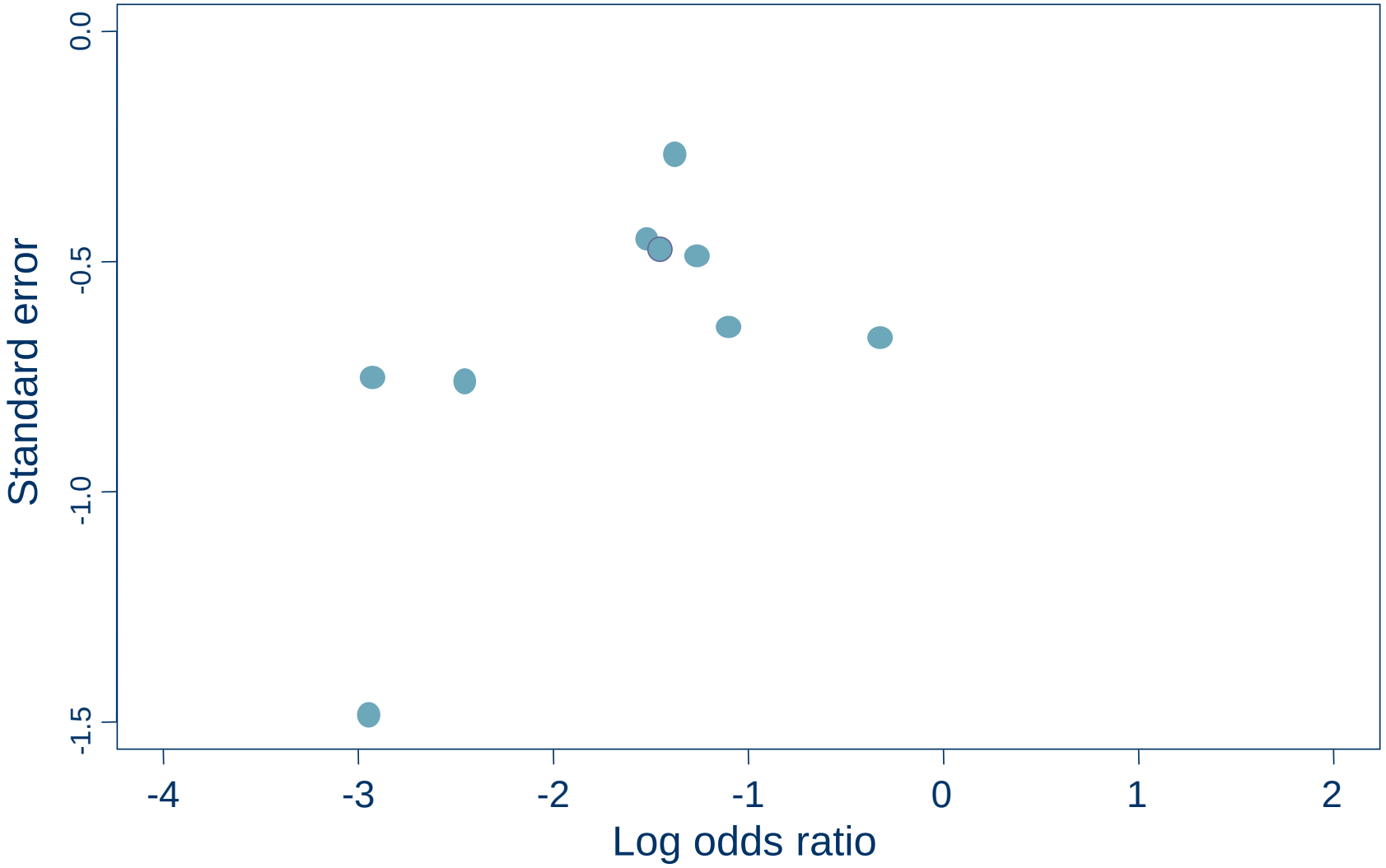
Funnel plot example



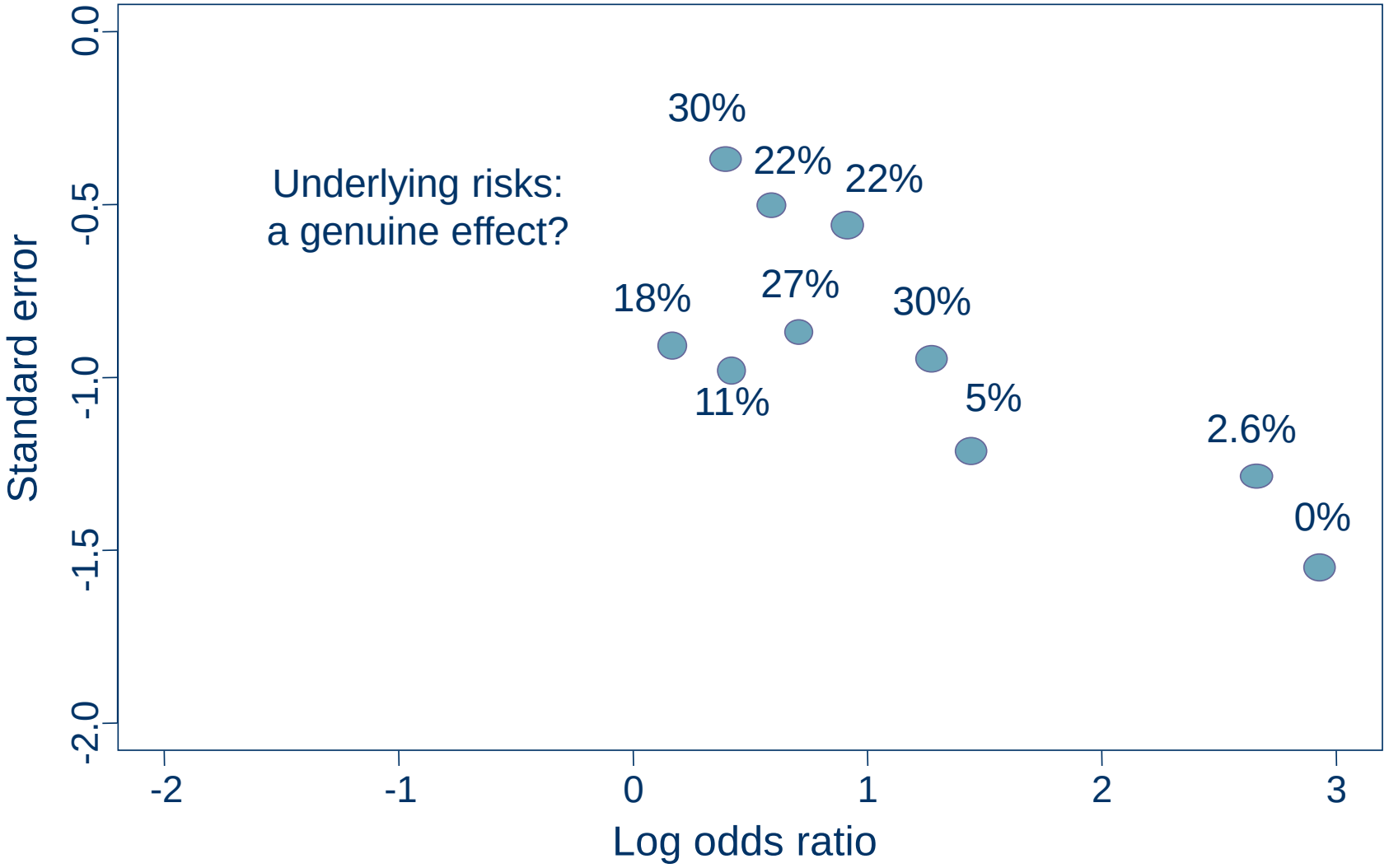
Funnel plot: albumin trials



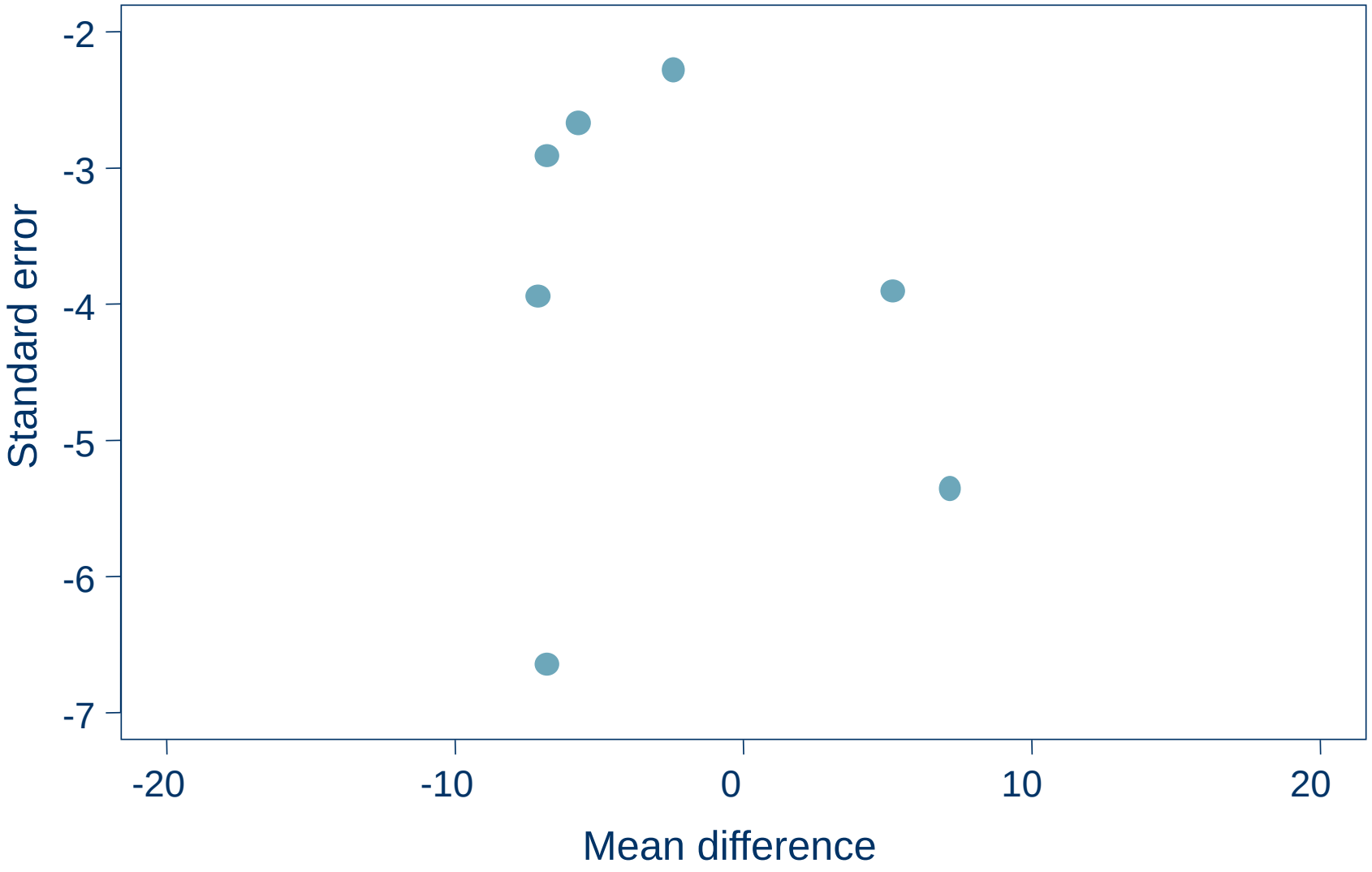
Prevention of chronic NSAID induced upper gastrointestinal toxicity



Aversive smoking for smoking cessation



Dieting to reduce body weight for controlling hypertension in adults



Funnel plot issues

- a range of studies of different sizes are required
- a skewed funnel plot may be caused by factors other than publication bias
  - clinical heterogeneity
  - methodological heterogeneity
- requires a subjective assessment

Statistical tests for detecting and correcting asymmetry

Detecting

- rank correlation test (Begg & Mazumdar 1994)
- linear regression test (Egger et al. 1997)
- both have low power

Correcting

- ‘Trim and fill’ method
- Fail safe N

Seldom used

Preventing publication/reporting bias

- methods of the review
- data bases
- grey literature
- registers of trials
- prospective meta-analysis

Take home message

- beware of publication and related biases
- funnel plots may be used to investigate relationship between precision (sample size) and treatment effect
- a relationship *may* be due to publication bias
- statistical methods to detect and correct publication bias exist but seldom used
- prevention is better than cure

Resources and support

- Cochrane Handbook for Systematic Reviews of Interventions v.4.2
  - http://www.cochrane.org/resources/handbook/index.htm
- Open Learning Materials v.1.1
  - http://www.cochrane-net.org/openlearning/
- RevMan 4.2 software and user guide
  - http://www.cc-ims.net/RevMan
- Style guide v.2.3
  - http://www.liv.ac.uk/lstm/ehcap/CSR/home.html
- CRGs: group-specific resources
- Australasian Cochrane Centre: http://www.cochrane.org.au
- AusInfo moderated list: http://cochrane.de/mailman/listinfo/ausinfo