

Systematic Review & Meta-analysis

These are often considered the highest form of evidence and there is no doubt that they can be very helpful bringing together a variety of similar studies addressing the same question. That said, systematic reviews and meta-analyses can also have multiple biases, some profoundly altering interpretation and results. These can in turn lead to more, rather than less confusion. To enhance your understanding of systematic reviews and meta-analyses, it is important we lay a little groundwork first.

DEFINITIONS

Systematic Review

A careful, thorough, and rigorous review of evidence related to a focused clinical question. This includes a methodical search and identification of research, extraction of data and assessment of quality, and summation of the study results.

Meta-analysis

This is the mathematical action of adding the results of studies together. The graphs are called meta-graphs, Forest Plot, or Blobograms. Meta-analysis is not required for every systematic review but preferred if studies are suitable for combining.

Sample Meta-graph

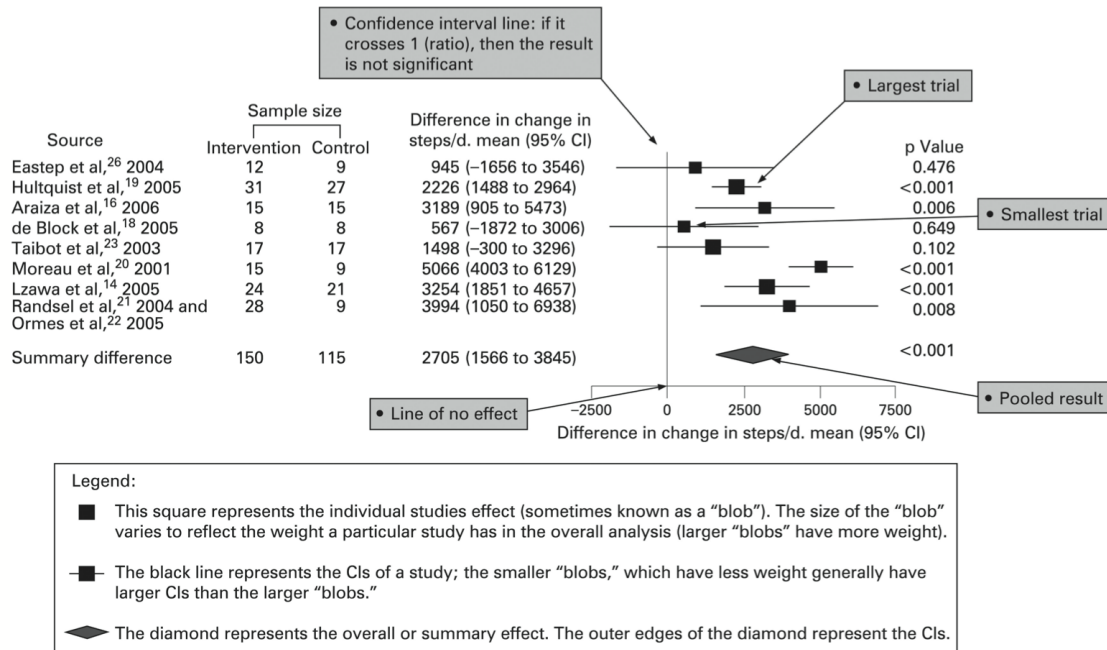
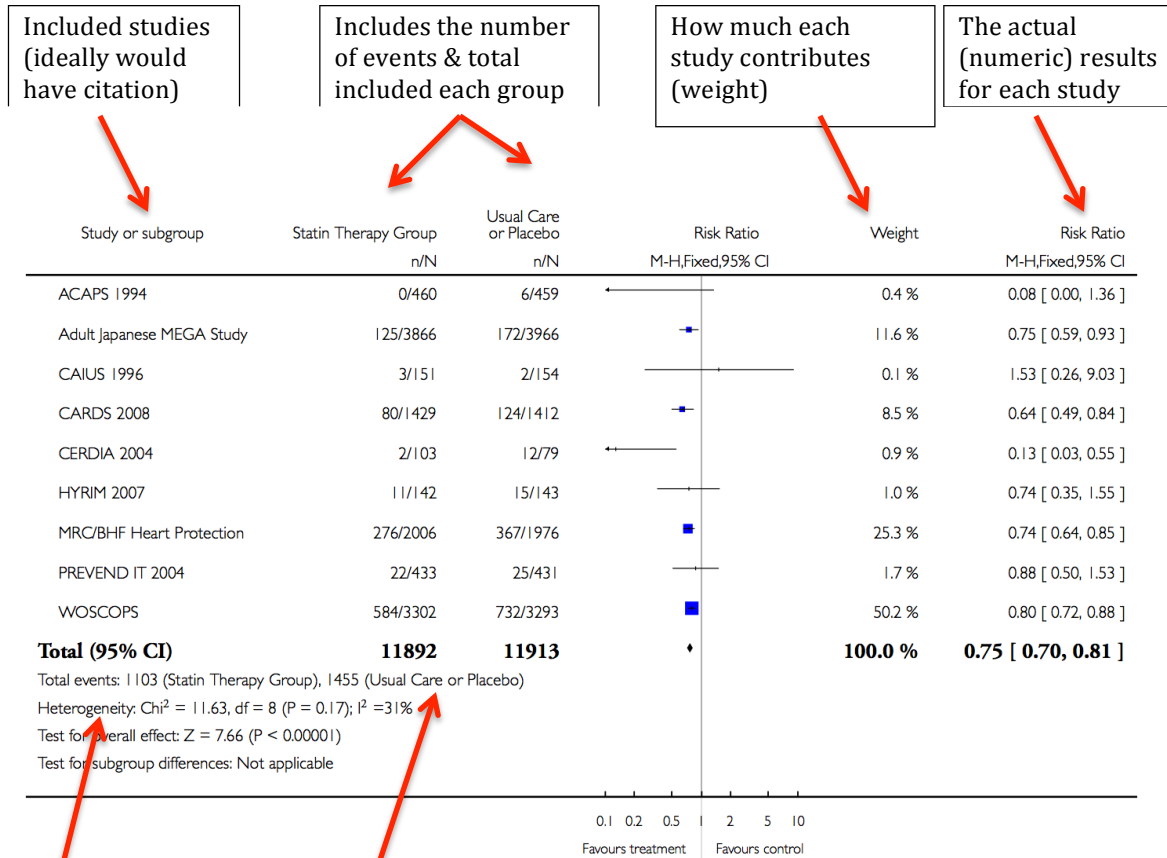


Figure. Basic components of a forest plot (based on Bravata DM, Smith-Spangler C, Sundaram V, et al. JAMA. 2007;298:2296-304.)

Here is an example of a good meta-graph (not the research per-se but what was included in the meta-graph allowing for interpretation).



Cochrane Database Syst Rev. 2013 Jan 31;1:CD004816.

Included studies (ideally would have citation)

Includes the number of events & total included each group

How much each study contributes (weight)

The actual (numeric) results for each study

Heterogeneity - typically with an I² number – an indication of how similar are the results
0% - no heterogeneity
25% - low heterogeneity
50% - moderate heterogeneity
75% - high heterogeneity

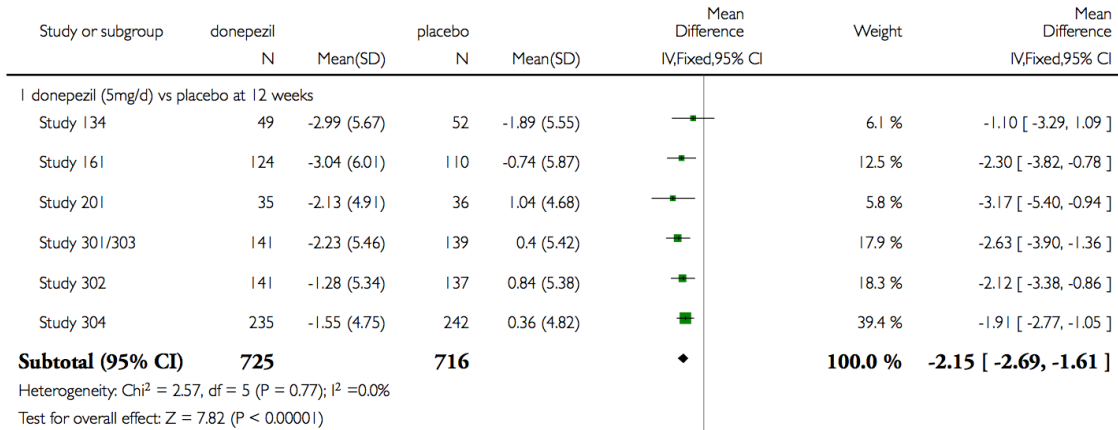
Final numbers of events and total participants in each arm (can use to do “cheater” NNT)

Shows what side is “better” for treatment or control

Examples of Meta-analyses

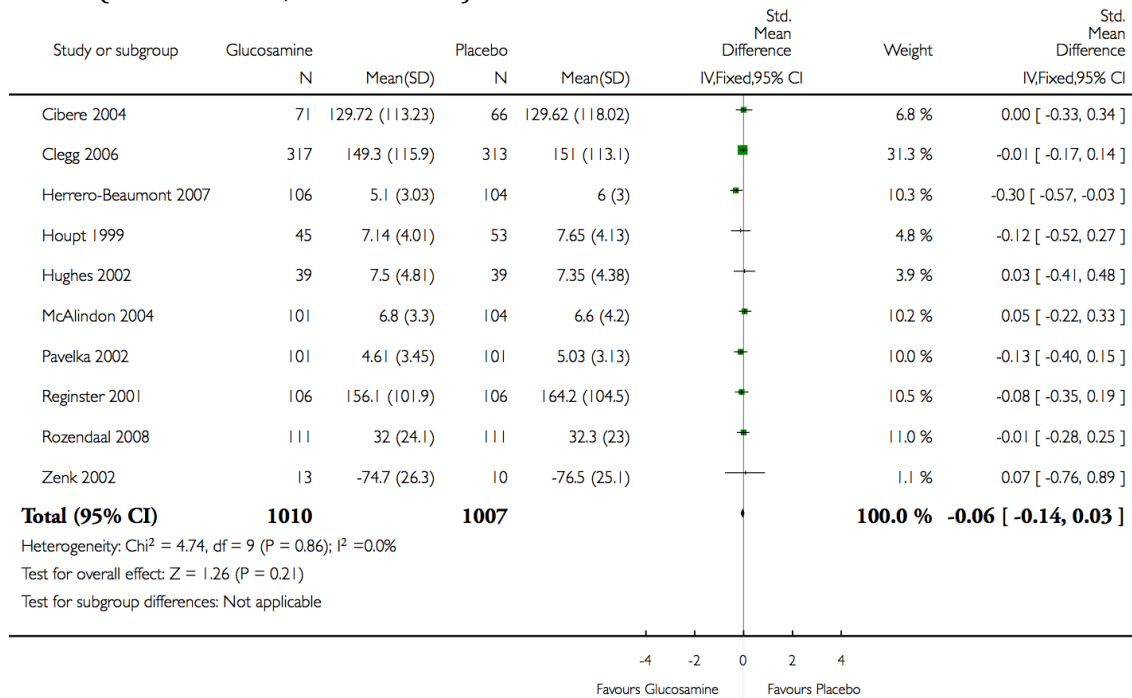
Have a look and see if you can figure out if the results were statistically significant and if the individual trial results were quite different (heterogeneous)?

1) Statistical significance Yes; Heterogeneity No (ADAS-cog changes with donepezil in dementia)



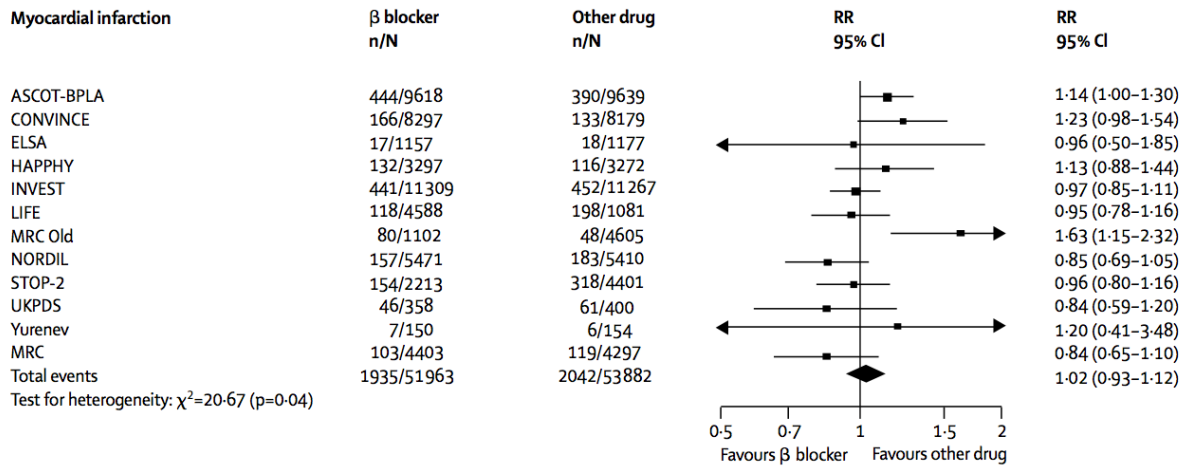
Cochrane Database Syst Rev. 2006 Jan 25;(1):CD001190.

2) Statistical significance No; Heterogeneity No (Glucosamine, best studies)



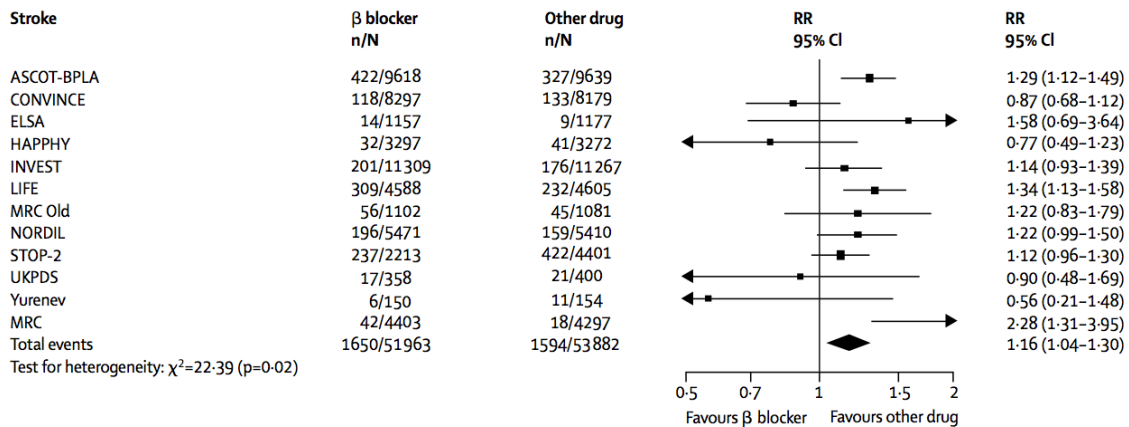
Cochrane Database Syst Rev. 2005 Apr 18;(2):CD002946.

3) Statistical significance No; Heterogeneity Yes



Lancet. 2005 Oct 29-Nov 4;366(9496):1545-53.

4) Statistical significance Yes; Heterogeneity Yes



Lancet. 2005 Oct 29-Nov 4;366(9496):1545-53.