

# Systematic review or meta-analysis?

In the first of a new series looking at statistical terms, **Chris Cates** explains the difference between systematic reviews and meta-analyses.

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As far back as 1987, it was noted that experts asked to review a topic could choose whatever data they wanted to support their views, and that this was likely to be a biased selection of the total evidence available. A systematic review simply gives a clear description of the methods used to search for studies and then to select which studies should be included, assess their quality and combine the results. This should be transparent enough to allow anyone else to repeat the process.

So what is the difference between a meta-analysis and a systematic review? The answer is that a meta-analysis is purely a statistical technique for averaging an effect of treatment across studies. The systematic review will identify the studies that are out there; there may be none, or it may be that

the trials are so different from each other that it makes no sense to try to find the average effect, in which case the reviewers will not carry out a meta-analysis. If there are suitable results from similar studies, these can be combined using a meta-analysis and usually displayed as a Forest plot, such as the one shown below.

This Forest plot is taken from a recent Cochrane review comparing long-acting beta<sub>2</sub>-agonists with leukotriene receptor antagonists for asthmatic patients who are not controlled by moderate doses of inhaled steroids.<sup>1</sup> The outcome shown is for asthma exacerbations, and each line represents one trial. On their own, most of these trials do not show a significant effect (the confidence interval crosses the vertical line of no difference), but when added together, a significant benefit is seen in favour of salmeterol. The pooled risk ratio is 0.83 (with a 95% confidence interval of 0.71 to 0.97), as shown by the diamond at the

bottom of the chart, which is just clear of the line of no difference.

By combining the results of all the available trials, we can be more confident about the size and significance of the difference between the two treatments. The next article in this series will further explore p values and confidence intervals.

**REFERENCE**

1. Ram FSF, Cates CJ, Ducharme FM. Long-acting beta<sub>2</sub>-agonists versus anti-leukotrienes as add-on therapy to inhaled corticosteroids for chronic asthma. *The Cochrane Database Of Systematic Reviews* 2005, Issue 1.

