Statistical methods for reliably updating meta-analyses

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It is increasingly common for systematic reviews to be updated as new research evidence emerges. Any meta-analyses included in the review will therefore also need updating.

If the aim of the review is solely to present the best current evidence standard meta-analysis approaches may be sufficient, provided reviewers are aware that results may change at later updates. However, if the review is used for decision making more caution may be needed.

When using standard meta-analysis methods, the chance of incorrectly concluding that the intervention of interest is beneficial when, in fact, it is ineffective (i.e. the type I error) increases rapidly as more updates are performed. So it is important not to over-interpret apparently favourable findings. Inaccurate estimation of any heterogeneity across studies may also lead to inappropriate conclusions.

This talk considers two methods to avoid some of these statistical problems when updating meta-analyses: trial sequential analysis and sequential meta-analysis. These methods control for type I and II errors (failing to detect a genuine effect) and take account of heterogeneity. This presentation compares the methods and considers how they might best be applied when updating meta-analysis, and how they can be used to guide the timing and nature of systematic review updates.

Keywords:

Systematic reviews, Updating, Sequential analysis, Heterogeneity