Title: **Applications of Estimating Treatment Effects in Meta-Analyses with Missing Data**

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Abstract:

When screening publications for inclusion in meta-analyses it is not always possible to restrict the analysis to randomized controlled trials (RCTs). Using this restriction often reduces the number of eligible trials to a small percentage of all publications on a particular treatment or in a specific disease and, in some cases, may preclude meta-analysis entirely. This is an ongoing and growing problem for anyone synthesizing research and performing meta-analyses. It is due in part to the exploding number of clinical journals reporting results of clinical trials and also to the variable quality of the studies being reported. If many studies are excluded, the resulting meta-analysis including only RCTs may produce biased effect estimates not representative of the total published research. This paper examines three instances of missing data and illustrates methodologies to address these problems with examples. The three types of missing information examined in this paper are: (1) including uncontrolled comparative studies or single-arm trials with RCTs in comparative meta-analyses; (2) testing treatment differences when randomized controlled trials exist only between treatments and placebo; and (3) inputing treatment differences in multicenter trials with inconsistent comparative groups over sites when individual patient data is available.