

Comparison of meta-analysis using literature and using individual patient data

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Abstract

The problem of combining information from separate studies is a key consideration when performing a meta-analysis, or planning a multicenter trial. Although there is a considerable journal literature on summary versus individual patient data, recent articles in the medical literature indicate that there is still confusion and uncertainty as to the precision of an analysis based on aggregate data. In this paper we address this issue by considering the estimation of a linear function of the mean, based on linear models for individual patient data. The setup, which allows for the presence of random effects and covariates in the model, is quite general, and includes many of the commonly employed models. The one-way fixed-effects model and the two-way model without interaction and fixed or random study effects are all obtained as special cases. For this general model we derive a condition for the estimator based on summary data to coincide with the one obtained from individual patient data, extending considerably earlier work. The implications of this result for the specific models mentioned above are illustrated in detail, both theoretically and in terms of two real data sets, and the role of balance is highlighted.