Challenges, strengths and weaknesses of aggregate data, individual patient data and network meta-analysis

E. Kontopantelis
the Farr Institute for Health Informatics Research, University of Manchester, UK
NIHR School for Primary Care Research, University of Manchester, UK

Meta-analysis sits at the top of the evidence pyramid and rightly so. It encompasses a large number of statistical approaches that can aggregate results from numerous studies, to provide conclusive evidence across all research fields. The main meta-analytic approaches include the standard meta-analysis (formally, meta-analysis of aggregate data), meta-regression, individual patient meta-analysis, network meta-analysis of aggregate data and network meta-analysis of individual patient data. First, we will discuss when it is suitable to use each of these broad methodological approaches, in other words, what questions they are designed to answer. Next, in practical terms, we will discuss how a researcher should conduct each of these analyses, i.e. what is the process, what are the appropriate models to use (and software) and, in general, what are the resources required. Finally, we will discuss the strengths and weaknesses of each approach, focusing on common mistakes, misconceptions and oversights.