

## Use of Bayesian meta-analysis for modelling complex data in health care

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### Abstract:

Evidence-based decision-making requires careful synthesis of available evidence. When assessing new health technologies to make policy decisions, the evaluation process relies heavily on meta-analysis of effectiveness of new interventions. The evidence base is typically obtained from the systematic literature review of randomised controlled trials and sometimes observational studies. There is often a lot of heterogeneity in reporting of clinical outcomes due to, for example, variety of scales on which effectiveness can be measured, different time points at which different studies report their outcomes or different control arms, or different designs of studies which are the source of evidence. Bayesian statistics provides flexible framework for modelling complex data structures by allowing multiple parameters to be modelled simultaneously, while taking into account of uncertainty around all relevant parameters. This seminar aims to introduce the concepts of Bayesian methods for efficient synthesis of evidence in health care evaluation. Multivariate evidence synthesis will be introduced and the applications illustrated in a number of scenarios for its use: for purpose of combining data on correlated outcomes from diverse sources of evidence and the implications for estimating the health-related quality of life values; predicting treatment effect on a target clinical endpoint from treatment effects on surrogate endpoints; and exploiting such prediction framework to inform decision modelling.