A three-day training course at Keele University: 30th March to 1st April, 2020

STATISTICAL METHODS FOR EVIDENCE SYNTHESIS OF INDIVIDUAL PARTICIPANT DATA

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AIMS

This three-day statistical course provides a detailed foundation of the methods and principles for meta-analysis when IPD (Individual Participant Data) are available from multiple related studies.

The course considers continuous, binary and time-to-event outcomes, and covers a variety of modelling options, including fixed effect and random effects. Days 1 and 2 mainly focus on the synthesis of IPD from randomised trials of interventions, where the aim is to summarise a treatment effect or to examine treatment-covariate interactions. We outline how to use either a two-stage framework (day 1) or a one-stage framework (day 2) for the meta-analysis, and compare their pros and cons.

Day 3 focuses on novel extensions including multivariate and network meta-analysis of IPD to incorporate correlated and indirect evidence (e.g. from multiple outcomes or multiple treatment comparisons). Special topics will also be covered, including: (i) IPD meta-analysis to identify prognostic/risk factors, (ii) IPD meta-analysis of test accuracy studies; (iii) estimating the power of a planned IPD meta-analysis; and (iv) dealing with unavailable IPD. The course consists of a mixture of lectures and practical sessions to reinforce the underlying statistical concepts. Participants can choose either Stata or R for the practicals. The key messages are illustrated with real examples throughout the course.

LEARNING OBJECTIVES:

- Understand the difference between IPD and aggregate data, and the rationale for an IPD meta-analysis of randomised trials
- Recognise the challenges of setting up an IPD meta-analysis, but also the many potential advantages
- Know how to conduct one-stage and two-stage fixed effect and random effects IPD meta-analyses
- Understand how to model, explain and interpret heterogeneity between studies
- Understand when and why one-stage and two-stage methods may differ
- Appreciate how to derive percentage study weights in two-stage and one-stage IPD meta-analysis models
- Recognise why it is essential to account for the clustering of participants within studies in an IPD meta-analysis
- Know how to write-down and fit fundamental IPD meta-analysis models for continuous, binary and time-to-event outcomes
- Understand how to estimate patient-level effect modifiers (treatment-covariate interactions, predictive markers) in an IPD meta-analysis, and why these are important for stratified medicine
- Know the meaning of the terms publication bias, availability bias, and selection bias, and how to examine them
- Understand evidence synthesis models for combining IPD studies with aggregate data from non-IPD studies
- Understand meta-analysis models for identifying risk or prognostic factors using IPD from observational studies
- Understand the difference between univariate and multivariate meta-analysis models
- Recognise why multivariate methods are important for evidence synthesis of multiple outcomes
- Appreciate the potential benefits of IPD for network meta-analysis of multiple treatments
- Understand how IPD facilitates multivariate meta-analysis by deriving within-study correlations via bootstrapping
- Appreciate the importance of multiple imputation and how it may be undertaken in an IPD meta-analysis
- Recognise the importance of the PRISMA-IPD reporting guidelines
- Recognise possible options for calculating the power of an IPD meta-analysis, in advance of collecting IPD
- Gain experience at fitting key IPD meta-analysis models in the Stata software, through practical sessions including: one-stage IPD meta-analysis approaches; two-stage IPD meta-analysis approaches; estimation of treatment-covariate interactions; multivariate and network meta-analysis using IPD.

TARGET AUDIENCE

The course is aimed at individuals that want to learn how to plan and undertake an IPD meta-analysis. We recommend that participants have a background in statistics as the course assumes a good understanding of core statistical principles and topics, such as regression methods (such as linear, logistic, and Cox), parameter estimation and interpreting software output.

A familiarity with traditional aggregate data (non-IPD) meta-analysis methods is advantageous, though not essential. We also recommend that participants are familiar with Stata or R, although the practicals will not require individuals to write their own code. Participants must bring their own laptop with R installed, or with Stata 13 or above installed..

COST: £550 (Students), £695 (Academics; Public Sector), £895 (Private sector). The cost includes all sessions, lunch on all days, a pub meal on the first evening and a gala dinner at Keele Hall on the second evening. Please note accommodation is not included for this course (see link below for nearby B&Bs).

For more details and to register for the course, please click here