A two-day training course at Keele University: 6th and 7th December, 2016

STATISTICAL METHODS FOR EVIDENCE SYNTHESIS OF INDIVIDUAL PARTICIPANT DATA

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AIMS

This two-day course will introduce participants to the fundamental statistical methods and principles for evidence synthesis and meta-analysis when IPD (Individual Participant/Patient Data) are available from multiple related studies. The course will consider **continuous, binary and time-to-event** outcomes, and both fixed-effect and random-effects meta-analysis models. Day 1 will focus mainly on the synthesis of IPD from ***randomised trials*** of interventions, where the aim is to quantify a ***treatment effect*** (usually in the presence of between-study heterogeneity) or to identify treatment effect modifiers (interactions) for ***stratified medicine***. Day 2 will focus on IPD methods for an evidence synthesis of observational studies, where the aim is to identify ***prognostic factors*** or to develop/validate a ***risk prediction (prognostic) model***. Day 2 will also focus on multivariate and network meta-analysis methods using IPD that jointly synthesise multiple correlated effects (e.g. from multiple outcomes, multiple treatment groups or multiple time-points). There will be a guest lecture on multiple imputation.

The key messages will be illustrated with real examples throughout, and participants will conduct a variety of IPD analyses within STATA, to practise the key methods and reinforce the learning points. The course assumes an understanding of core medical statistics topics, such as regression methods (such as linear, logistic, and Cox) and parameter estimation. A familiarity with traditional aggregate data (non-IPD) meta-analysis methods would be advantageous, though not essential. **Participants should bring a laptop with STATA 12 or above, or identify another attendee who has STATA to work alongside during the practicals**. The course is written and delivered by experts in evidence synthesis and meta-analysis methods using IPD.

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 & 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
- 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
- Appreciate the potential benefits and challenges of an IPD meta-analysis of observational studies
- Understand how to use evidence synthesis of IPD from multiple cohort studies to develop and validate a risk prediction model
- Understand the difference between univariate and multivariate meta-analysis models
- Recognise why multivariate methods are important for evidence synthesis of multiple correlated effects (such as multiple outcomes, multiple treatments, multiple time-points), and why network meta-analysis is essentially a multivariate meta-analysis
- 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
- Gain experience at fitting key IPD meta-analysis models in the STATA software, through 5 practical sessions covering: (i) one-stage and two-stage IPD meta-analysis approaches; (ii) estimation of treatment-covariate interactions; (iii) multivariate meta-analysis using IPD; (iv) network meta-analysis using IPD; (v) validation of a risk prediction model using IPD from multiple studies.

COST: Student £400; Academic (public sector) £550; Industry (commercial) £750
(Includes one nights accommodation, lunch on both days and a pub meal on the evening of the 6th)

To register for the course please click on the below link and complete the registration form:
http://estore.keele.ac.uk/

Key reference: Riley RD, Lambert PC, Abo-Zaid G: Meta-analysis of individual participant data: rationale, conduct, and reporting. *BMJ* 2010;340:c221. DOI 10.1136/bmj.c221

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