30 Years of DerSimonian and Laird's Methodology - A Celebration!

Wednesday 13th April 2016

This year (2016) marks the 30th anniversary since publication of the landmark paper "Meta-analysis in clinical trials" by DerSimonian & Laird (1986, Controlled Clinical Trials 7, 177-188).

To celebrate this milestone, the BIR present a meeting to set the paper into a modern context. Speakers include Julian Higgins (University of Bristol), Kerry Dwan (University of Liverpool), Richard Riley (Keele University) and Theo Stijnen (LUMC), plus Nan Laird as a special guest discussant.

Venue: University College London (Room G29: J Z Young Lecture Theatre)

Registration (including lunch): £10 BIR student member; £25 BIR full or retired member; £50 non-member.

Note that IBS-BIR full membership costs £40 for 2016: this includes full membership of the IBS (www.biometricsociety.org/), discounted registration to BIR meetings and IBC, online access to slides from BIR meetings and to the IBS journals, Biometrics and JABES. Why not sign up now (bir.biometricsociety.org/membership) and get reduced registration for this meeting plus these added benefits?

Programme

12:00 - 13:00	**The DerSimonian and Laird (1986) paper: introduction and history** **Julian Higgins (University of Bristol)** The paper 'Meta-Analysis in Clinical Trials' published in *Controlled Clinical Trials* in 1986 is one of the most highly cited research publications. It describes a random-effects model for meta-analysis and applies it to a series of previously published meta-analytic data sets. A particular feature of the paper is the use of a non-iterative moment estimate of the between-study variance in treatment effects. This made random-effects meta-analysis a highly accessible alternative to the fixed effect(s) approach. I will describe the different models for meta-analysis and summarize the methods presented in the paper. I will place the paper into the context of meta-analysis in the mid1980s, and comment on the impact that the paper had on evidence-based medicine.
13:00 - 14:00	**Lunch**
14:00 - 14:45	**Random effects meta-analysis in the real world** **Kerry Dwan (University of Liverpool)** For the past 20 years Cochrane has summarised the best evidence from research to allow informed decisions to be made regarding treatment – in the form of systematic reviews. Review Manager (RevMan) is the software used for preparing and maintaining Cochrane reviews. Currently the DerSimonian and Laird method is the only random effects model to be implemented in RevMan. In this talk I will discuss the current Cochrane guidance given to reviewers regarding fixed and random effects models, consider how many Cochrane reviews actually use the random effects model and provide examples from both Cochrane and non-Cochrane reviews and discuss what the future may hold for Cochrane reviews.

14:45 - 15:30	**Random effects meta-analysis in the modern era** **Richard Riley (Keele University)** The 1986 paper 'Meta-Analysis in Clinical Trials' by DerSimonian and Laird was a breakthrough for the application of random-effects meta-analysis. Now thirty years on, random-effects meta-analysis models remain hugely popular and are increasingly relevant due to the large volume of medical research available across heterogeneous populations and settings. In this talk, I will illustrate modern advances and applications of random-effects meta-analysis models. This will include topics such as multivariate meta-analysis of correlated outcomes, network meta-analysis of multiple treatments, and meta-analysis of individual participant data. Application will be broad, including randomised trials, diagnostic test accuracy studies, and risk prediction (prognostic) models. Unresolved and contentious statistical issues will also be noted, including the derivation of 95% confidence and prediction intervals; accounting for uncertainty in the estimated between-study heterogeneity; and the use of a Bayesian approach with empirically based prior distributions.
15:30 - 16:00	**Afternoon tea**
16:00 - 16:45	**Generalised mixed models for random-effects meta-analysis** **Theo Stijnen (Leiden University Medical Centre)** Traditionally, meta-analysis often follows a summary measures approach based on the estimated effect sizes and standard errors of the studies. As does the method of DerSimonian and Laird, it is common practice to assume an approximately normal within study likelihood for the effect sizes and to treat the standard errors as known. However, often the exact within study likelihood is available. For instance if the data are in the form of events and sample size per treatment group, events and total person time per group, or mean, standard deviation and sample size per group. Then the within and between studies likelihood can be combined into what is can be called a one-stage approach. In principle this offers several advantages, such as avoiding the assumption of known standard errors. This leads to generalized linear mixed models that can be fitted in standard statistical software. In this presentation I will discuss the generalized linear mixed model as a framework for meta-analysis.
16:45 - 17:00	**Guest discussant - Nan Laird**
18:00 -	**End of day**