Course

Introduction to Pairwise and Network Meta-Analysis

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By Nicky Welton

Professor of Statistical and Health Economic Modelling
Population Health Sciences
Bristol Medical School
University of Bristol, UK

Course Aims

Pairwise meta-analysis (PW-MA) is a method that pools evidence from randomised controlled trials (RCTs) that compare the same two interventions. Network meta-analysis (NMA) extends this to multiple interventions, where each RCT compares two or more different interventions. NMA allows one to simultaneously estimate relative effectiveness for any pair of interventions forming an evidence network. The validity of the methods rest on the assumption of exchangeability of study effects both within and between intervention contrasts. It is therefore important to test for and investigate causes of heterogeneity, and for NMA whether this depends on intervention contrast (known as inconsistency). The aim of this course is to introduce pairwise and network meta-analysis, including exploration of heterogeneity and inconsistency.

Learning Objectives

By the end of the course participants should be able to:

- understand the need for systematic reviews and (network) meta-analysis
- understand the difference between “fixed effect” and “random effects” pairwise meta-analysis models
- be able to interpret the output from a pairwise meta-analysis
- be aware of possible causes of heterogeneity and methods to test for this
- understand how subgroup analyses and meta-regression can be used to explore heterogeneity, and acknowledge the limitations of these methods
- understand what indirect comparisons and network meta-analysis (NMA) are
- understand the difference between the “fixed effect” and “random effects” network meta-analysis models
- be able to interpret the output from a network meta-analysis
- be aware of different techniques to present and use the results from NMA
- understand the assumptions made in NMA, and different methods to test for inconsistency
- understand how meta-regression and subgroup analyses can be applied in NMA
- identify appropriate likelihood and link functions for different outcome measure types, in a generalised linear modelling framework

- be aware that shared parameter models allow studies to be combined that report different, but related, outcomes

Who is this course for?

This course is designed for epidemiologists, statisticians, and decision analysts. It is assumed that participants are familiar with linear and logistic regression.

Outline of the course program

DAY 1

09:00-10:00	Introduction to Pairwise Meta-Analysis: Fixed and Random Effects Models
10:00-10:30	Practical: Interpreting Pairwise Meta-Analysis
10:30-11:00	COFFEE
11:00-12:00	Exploring heterogeneity: subgroup analyses, meta-regression, and bias-adjustment
12:00-12:30	Practical: Heterogeneity and meta-regression
12:30-13:30	LUNCH
13:30-14:30	Introduction to Indirect Comparisons
14:30-15:00	Practical: The Bucher method
15:00-15:30	TEA
15:30-16:00	Introduction to Network Meta-Analysis
16:00-17:00	Practical: Interpreting Network Meta-Analysis

DAY 2

09:00-10:00	Assumptions and FAQs
10:00-11:00	Methods for Consistency Checking
11:00-11:30	COFFEE
11:30-12:00	Practical: Consistency Checking
12:00-12:30	Meta-regression for NMA
12:30-13:30	LUNCH
13:30-14:00	Practical: Meta-regression for NMA
14:00-15:00	Generalised Linear Model Framework: Other outcome types
15:00-15:30	TEA
15:30-16:00	Practical: Other outcome types
16:00-17:00	Further topics: Shared parameter models, Bias modelling, Multiple outcomes, …

References

1. Welton NJ, Sutton AJ, Cooper NJ, Abrams KR, Ades AE. Evidence synthesis for decision making in healthcare. Wiley. Chichester. 2012.
2. Dias S, Ades AE, Welton NJ, Jansen JP, Sutton AJ. Network Meta-analysis for Comparative Effectiveness Research. Wiley. Hoboken NJ. 2018.
3. Dias S, Welton NJ, Sutton AJ, Ades AE. Evidence synthesis for decision making. Parts 1-7. Medical Decision Making 2013 33:597-691

The course is organized by L-Biostat (KU Leuven, Belgium). Theoretical sessions will be alternated with sessions in which the concepts learned can be practiced through exercises, using the BUGS software (WinBUGS/OpenBUGS). To fully participate in the practical exercises participants should bring a laptop computer to the course, with WinBUGS already downloaded from the BUGS Project website (), the patch installed and key decoded. It is advised that prior to the course the participants not already familiar with WinBUGS read through the Tutorial in the User Manual, and explore the BLOCKER example in the online Help Menu (Help_Examples Vol 1_Blocker) (NB you need to use initial values Inits2 for this to run). Other software solutions in Stata will also be provided.

Location: Room 00.34/00.46, Joris Helleputte, Minderbroedersstraat 8, 3000 Leuven

Costs

I-Biostat member:	**50 Euro**
Student:	**150 Euro**
Academic member:	**250 Euro**
Non-academic member:	**500 Euro**

Note: ISCB members (not: I-Biostat members or students) are entitled to a **50 Euro reduction** upon showing a **valid proof** of their ISCB membership.

To register: go to https://ibiostat.be/seminar/Meta-analysis-2018/regformcoursemetaanalysis2018**.**

Additional practical information can be obtained from **Kirsten Verhaegen** at L-Biostat (kirsten.verhaegen@kuleuven.be).