Meta-analysis:
Advanced methods using the Stata software

(A comprehensive and thorough training based on theory + software + practice)

Lausanne, September 11 to 14, 2018

Tuesday 11 September 2018 - Room EST, La Ferme, Epalinges - Stata: a crash course

Morning	
Introduction	9h00-9h15
Data loading (use, import, infile, insheet) Variable checking, cleaning, etc. (describe, codebook) Creation of a Do-File Creation of a Log-File	9h15--10h30
Coffee break	*10h30-10h45*
Exercises (1+2)	10h45-11h15
Merging data files (merge, append) Reshaping the data (reshape)	11h15-11h45
Exercises (3)	11h45-12h00
Type and format of variables Generating variables Manipulation of variables (recoding, labeling, etc.)	12h00-13h00
Lunch break	*13h00-14h00*

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Afternoon	
Logical operations and filters Manipulation of dates Summary of variables, cross-tables, etc. Graphics (histogram, graph box, scatter plot, etc.) Some commonly used statistical tests (ttest, ranksum, anova, kwallis)	14h00-15h30
Coffee break	*15h30-15h45*
Exercises (4)	15h45-17h00

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Wednesday 12 September 2018 - Salle Delachaux, IUMSP, Biopôle 2, 01/149 - Introduction to meta-analysis

Morning	
Introduction I. Why do a meta-analysis? II. How does a meta-analysis work?	9h00-9h15
Some concepts III. Definition of an «effect size» 1. The concepts of parameter, estimator and estimation	9h15-09h35
2. «Effect sizes» based on means a. The mean (mu) b. The difference in means (D) c. The standardized mean difference (d and g) d. The ratio of means (R) e. Which of the measures D, d, g and R to use and when?	9h35-10h30
Coffee break	*10h30-10h45*
Exercises (means)	10h45-11h30
3. « Effect sizes » based on binary data a. The proportion (p) b. The Relative Risk (RR) c. The Odds Ratio (OR) d. The Risk Difference (RD) e. Which of the three measures RR, OR et RD to use and when?	11h30-12h15
Exercises (binary data)	12h15-13h00
Lunch break	*13h00-14h00*

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Afternoon	
4. «Effect sizes» based on correlations 5. Conversion of «Effect sizes»	14h00-14h20
Exercises (correlations and conversions)	14h20-14h45
IV. Fixed effect model versus random effects models 1. The fixed effect model a. Estimation of the fixed effect model : «Inverse variance method» b. Estimation of the fixed effect model with rare events	14h45-15h30
Coffee break	*15h30-15h45*
2. The random effects model a. Estimation of the «between-study» variance b. Estimation of random effects model: «DerSimonian&Laird» method c. Estimation of random effects model with rare events 3. How to choose between the two models	15h45-16h30
Exercises (fixed effect model)	16h30-17h00

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Thursday 13 September 2018 - Room EST, La Ferme, Epalinges - Advanced meta-analysis techniques

Morning	
Exercises (random effects model)	9h00-9h45
V. The heterogeneity 1. Sources of heterogeneity 2. How to identify heterogeneity?	9h45-10h30
Coffee break	*10h30-10h45*
3. Quantifying heterogeneity a. The calculation of Cochrane Q b. The estimation of the variance τ_2 across studies c. The calculation of I^2 4. How to deal with heterogeneity?	10h45-11h30
Exercises (heterogeneity)	11h30-12h30
VI. Prediction interval	12h30-12h45
Exercises (prediction interval)	12h45-13h00
Lunch break	*13h00-14h00*

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Afternoon	
VII. Subgroups analysis 1. Which model to adopt to calculate the «combined» effect for each subgroup? 2. Is it reasonable to calculate an overall «combined» effect from each of the subgroups «combined» effect and how? 3. Method for comparing subgroups 4. The proportion of variance explained R2	14h00-15h00
Coffee break	*15h00-15h15*
Exercises (the analysis of subgroups)	15h15-16h00
Evening dinner together (by the lake)	18h00-21h00

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Friday 14 September 2018 - Room EST, La Ferme, Epalinges - Advanced meta-analysis techniques

Morning	
VIII. The meta-regression 1. The mathematical model 2. The residual heterogeneity indexes 3. The test of residual heterogeneity 4. The proportion of variance explained 5. The prediction interval 6. The false positive risk and the «ecological bias»	9h00-10h00
Exercises (meta-regression)	10h00-10h30
Coffee break	*10h30-10h45*
IX. Diagnostic tools 1. Investigation of selection bias and publication bias a. The funnel plot b. Tests of funnel plot asymmetry c. The contour-enhanced funnel plot d. What are the practical consequences of a «funnel plot» asymmetry	10h45-11h45
Exercises (diagnostic tools: the funnel plot)	11h45-12h30
2. Sensitivity analysis, residual analysis, and detection of influential studies a. The stratified funnel plot b. The Trim&Fill method	12h30-13h00
Lunch break	*13h00-14h00*

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Afternoon	
c. The cumulative meta-analysis d. Residual analysis e. The detection of influential studies	14h00-15h00
Exercises (diagnostic tools: sensitivity analysis)	15h00-15h30
Coffee break	*15h30-15h45*
X. Can we combine randomized studies with observational studies? 1. Fundamental differences between RCTs and observational studies 2. Adjustment based on quality scores 3. How many studies are required to conduct a meta-analysis?	15h45-16h15
Evaluation and conclusion	16h15-16h30