Epi-on-the-Island

An Introduction to Multilevel Modelling

11-15 June 2018

Tentative Schedule

Day	Time	Lecture	Laboratory	Pages in VER 2
Mon	8:30 - 10:00	(ID-1) Introduction to the course, (ID-2) Introduction to correlated data		529 - 544
	10:30 - 11:15	(ID-3) Mixed models for continuous data, variance component estimation		553 - 560 565 - 571
	11:15 - 12:00 1:30 - 2:15	(ID-4) Introduction to MLwiN		
	2:15 - 3:00 3:30 - 4:00		(ID/HS) Introduction to MLwiN / Fitting linear models (Exc. #1+2)	
	4:00 - 5:00	(HS-1) Introduction to generalized linear models		408 - 410 452 - 453
	5:00 - 6:00	Converting participants' data sets		
Tues	8:30 - 10:00	(HS-2) Mixed models for discrete data using pseudo/quasi-likelihood methods, including variance component estimation		579 - 599
	10:30 - 12:00		(HS/ID) Fitting logistic models (Exc. #4+5)	
	1:30 - 2:15	(HS-3) Random slopes and contextual effects		560-565
	2:15 - 3:00 3:30 - 4:00		(HS/ID) Random slopes and contextual effects (Exc. #3)	
	4:00 - 5:00	(ID-5) Residuals and diagnostics for mixed models		570 - 577 600 - 604
	5:00 - 6:00	Assisting participants to get started on their analysis		

Day	Time	Lecture	Laboratory	Pages in VER 2
Wed	8:30 - 9:00	(ID-6) Running MLwiN from Stata and R		
	9:00 - 10:00		(HS/ID) Evaluating linear and logistic models (Exc. #6+7)	
	10:30 - 12:00	(ID-7) Alternative approaches to dealing with clustered data (GEE, Robust variance estimation, Marginal vs subject-specific interpretation, Survey methods)		542 - 550 627 - 633
	1:30 - 3:00	(HS-4) Repeated measures data		607 - 627
	3:30 - 5:00		(HS/ID/JS) Alternative approaches (Exc. #8)	
	5:00 - 6:00	Participants free to work on own data		
Thur	8:30 - 10:00		(HS/ID) Repeated measures data (Exc. #9+10) OR work on own data	
	10:30 - 12:00	(HS-5) Advanced procedures for fitting multilevel models (MCMC, Maximum likelihood estimation)		594 - 595 637 - 659
	1:30 - 3:00		(HS/ID) Advanced procedures (Exc. #12)	
	3:30 - 5:00		(HS/ID) Participants work on their own data or a provided dataset	
	Evening	Course dinner		
Fri	8:30 - 10:00		(HS/ID) Participants work on own data or a provided dataset	
	10:30 - 12:00		(HS/ID) Participants work on own data or a provided dataset	
	1:30 - 3:00	Presentations by participants		
	3:30 - 5:00	Presentations by participants, Course wrap-up		

Course Information

Text:

The text for the course will be Veterinary Epidemiologic Research (2009), 2nd edition (http://www.upei.ca/ver). Course participants will be provided with the chapters of the book that deal specifically with multilevel models.

Software

The primary software used in the course will be MLwiN (http://www.bristol.ac.uk/cmm/software/). Participants wanting to work on it on a laptop computer they bring to the course should download the trial version (30 day license) or purchase the software before coming to the course. Some use will be made of Stata (a temporary licence will be made available and those wishing to install the program can do so) and of R (participants wishing to use R should have the program installed before coming to the course). We recommend Stata versions 13-14 (preferably with the gllamm package installed) and R version 3.0.1 or later (preferably with the lme4 library installed).

Course Preparation

In order to get the maximum value out of the multilevel modelling course, we encourage participants to bring their own data with them to the course. There will be time during the course to work on your own data and we will endeavour to have lots of help available in the lab sessions to expedite this process. The following actions are recommended:

1. **Prepare a 1 page description of your data / problem** using the template attached (next page). These will be copied at the beginning of the course and distributed to all course participants.

2. **Prepare your data (if you are bringing some)**: If you have data of your own which you would like to work on during the course, please bring a prepared dataset with you. Some suggestions for preparing the dataset are:

(a) one record per observation at the lowest level of the hierarchy (e.g. if the dataset contained data from lactations within cows within herds, the dataset should have 1 record per lactation)

(b) make sure that each observation is uniquely identified (e.g. herd id, cow id and lactation number)

(c) identify the key variables of interest and create a dataset with just those variables in it (rather than bringing the whole dataset if it is very large)

(d) if there are a lot of missing values, you might want to prepare a dataset that consists of those observations for which complete data are available

(e) you can bring the data in any computer format you like, but we would suggest that some form of spreadsheet (e.g., Excel or Open Office Calc) would be the easiest to work with (larger files can be brought in any statistical package format – SAS, SPSS, Stata). If you bring the data in a spreadsheet, have the variable names in row 1 and the data immediately below (starting in row 2) - do not include anything else in the spreadsheet.

Multilevel Model Project

Name:
Project Title:
Background: (provide a brief description of the background to your study)
Hypothesis: (what is the most important hypothesis you want to investigate)
Expectations: (what are your expectations in terms of results ... based on literature or previous work)
Levels of Organization: (list the levels in the hierarchy of your data and the approximate number of units at each level)
Key Dependent Variable: (describe the most important dependent (outcome) variable in your study)
Key Predictor(s): (identify a minimum of one and a maximum of four important predictors in your study and their level in the hierarchy (e.g. farm level variable, cow level variable)

Copies of these sheets will be distributed to all course participants