

Introductory and Advanced Multilevel Modelling

General Information

Clustered data are very common in veterinary medicine and techniques for appropriately analysing such data have developed tremendously over the past 15 years. This 2-part course will consist of a 2 day Introductory Module (for participants with no formal training in multilevel data analysis) followed by a 4 day Advanced Module in which more advanced topics will be covered and participants will have an opportunity to work on their own data. Participation in the Introductory Module requires a working knowledge of linear and logistic regression. Participation in the Advanced Module requires that the participant completes the Introductory Module or has had some formal instruction in multilevel modelling and has some familiarity with MLwiN. (Note: a trial version of MLwiN and extensive learning resources are available from the MLwiN website: <http://www.bristol.ac.uk/cmm/software/mlwin/>)

Workshop Specifications

This workshop will have to be offered as a pre-conference course to accommodate the instructors' teaching commitments at UPEI. The minimum number of participants is 10 and the maximum is 25. As noted above, the course will consist of 2 modules and participants may choose to take either or both. Participants are encouraged to bring a laptop on which they have pre-loaded the trial version of MLwiN. Participants not able to bring a laptop will be paired with another participant with a computer. Both Stata and R will also be used in the course and students wishing to use either of these programs will be encouraged to pre-load R (public domain software) or will be provided with a trial version of Stata during the course.

Workshop Contents

In general, each day will consist of a mixture of lectures and lab exercises using provided data sets. In addition, participants will be encouraged to work on their own data during the Advanced Module. Students will be encouraged to present their own analyses, for general discussion, on the last day of the workshop (however, this is strictly voluntary)

Introductory Module

Day 1 - Introduction to the course and to clustered data, basics of linear mixed models (LMM), introduction to MLwiN and a lab focused on fitting LMM in MLwiN

Day 2 - Generalized linear models, generalized linear mixed models (GLMM), lab on fitting GLMM, overview of multilevel model diagnostics (with lab)

Advanced module

Day 3 - Brief introduction and review of (generalized) linear mixed models, random slopes, contextual effects, lab on previous 2 topics, alternative approaches for dealing with clustered discrete data (with lab).

Day 4 - Advanced procedures (bootstrap confidence intervals, GLMM estimation procedures), lab on previous topics and/or time for students' to work on their own data, Bayesian methods and Markov Chain Monte Carlo (MCMC) estimation (with lab)

Day 5 - Procedures for analysing repeated measures of both continuous and discrete outcomes (with lab), advanced procedures for discrete repeated measures and time for student's to work on own data

Day 6 - 2nd repeated measures lab and/or additional time to work on own data, comparison of approaches for binary repeated measures, presentations by students (voluntary) of their own analyses

Course Fees

Course Fees are set at € 300 for the Introductory Module, € 600 for the Advanced Module, or € 800 for both modules

Workshop History

Versions of this workshop have been presented many times. The most recent presentations have been:

Date	# days	# of participants	Location	Comments
July 2011	1	~35	St. Louis	Overview workshop at the Annual Conference of the American Veterinary Medical Association
July 2011	5	20	PEI, Canada	Introduction to Multilevel Modelling course as part of Epi-On-The-Island
Nov. 2010	5	~ 16	Norway	part of NOVA Advanced Epidemiology course
April 2010	4	~ 15	Copenhagen, Denmark	Advanced Multilevel Modelling course with a focus on repeated measures binary data
Nov. 2009	5	~25	Sweden	part of NOVA Advanced Epidemiology course
June 2009	5	20	PEI, Canada	Introduction to Multilevel Modelling course as part of Epi-On-The-Island
May 2008	4	~20	Ghent, Belgium	Multilevel Modelling course

Instructor Bibliographies

Presenters: Henrik Stryhn, and Ian Dohoo.

Ian R. Dohoo

Dr. Ian Dohoo is an internationally known veterinary teacher and researcher (loosely translated this means he has been at it a long time). He is a Professor of epidemiology at the University of PEI and is the first author of the graduate level epidemiology text “Veterinary Epidemiologic Research”. Numerous students around the world have participated in epidemiology courses he has taught. Most survived the experience. He has a particular interest in the advancement of epidemiologic methods, including those used in analyses of hierarchical data, survival analyses, and meta-analyses. He has served both as the Director of the Centre for Veterinary epidemiologic Research (CVER at UPEI) and as an Associate Editor of Preventive Veterinary Medicine, (but don't blame him if your paper was rejected).



Henrik Stryhn

Henrik is a statistician by education but has over the last 15 years strayed into applications of statistics in veterinary science and epidemiology. In a position as Associate Professor of biostatistics at the Atlantic Veterinary College (University of PEI) he regularly tortures and nurtures students in statistical methods from the very basics to his favourite hobbyhorse of multilevel modelling. In recent years these activities have been extended to international courses at UPEI and in Europe, in particular his native Denmark. He is currently an Associate Editor with Preventive Veterinary Medicine (don't blame him for that rejected paper either). In addition, he engages in consulting for almost everyone who seeks advice in statistics and is not discouraged by perhaps having to wait a long time for an answer.

