

Department of Epidemiology and Biostatistics

Biostatistics 9651U Multi-level Modeling

Summer 2022

Lecture:

Tuesday 10:00 - 12:00 PHFM 3015
Thursday 10:00 - 12:00 PHFM 3015

Instructor: Yun-Hee Choi

Office Hours: By appointment

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Course Description

This course covers statistical methods for drawing inferences from multi-level data, including longitudinal data from cohort studies and clinical trials, as well as multilevel data in social and medical epidemiology. Topics include graphical exploration of data, and the use of linear and generalized linear regression models for correlated outcome data. Multilevel models, which include both fixed and random effects, will be discussed. Statistical software R will be used along the course and a self-learning guide to R will be provided.

Course Information

Enrollment in this course is restricted to graduate students in the Department of Epidemiology and Biostatistics, as well as any student that has obtained special permission to enroll in this course from the course instructor as well as the Graduate Chair (or equivalent) from the student's home program.

Prerequisite: Epidemiology 9553B and Biostatistics 9521B

Course Materials

Required: Finch, WH, Bolin, JE, and Kelley, K (2014) Multilevel Modeling Using R, CRC Press
Recommended: Vittinghoff, E, Glidden, DV, Shiboski, SC, and McCulloch, CE (2012) Regression Methods in Biostatistics Linear, Logistic, Survival and Repeated Measures Models, 2nd edition, Springer

Course Content and Schedule

| Week | Date | Topic | Textbook Chapter |
|------|--------|--|------------------|
| 1 | May 3 | Introduction to multi-level data structure | Chapter 1 |
| | May 5 | Multi-level models | Chapter 2 |
| 2 | May 10 | Fitting two-level models in R | Chapter 3 |
| | May 12 | Models for three and more levels | Chapter 4 |
| 3 | May 17 | Graphing data | Chapter 4 |
| | | Longitudinal data analysis | Chapter 5 |
| 4 | May 19 | Longitudinal data analysis | Chapter 5 |
| | May 24 | Generalized linear models | Chapter 7 |
| 5 | May 26 | Multi-level generalized linear models | Chapter 8 |
| | June 2 | Final Project Due | |

Add/Audit/Drop Deadline: within 10 business days of the start of the course

Methods of Evaluation

- 30% - One sentence quizzes (every class)
- 30% - Lab reports (R tutorials)
- 40% - Final project (Due on June 2, 2022)

Note that

1. This course is a Pass/Fail course.
2. To pass the course, students must obtain an overall mark of 75%.

Western Academic Policies and Statements

Policy on Accommodation for Medical and Non-Medical Absences

For assignments worth 10% or more, refer to Western University's Policy on Accommodation for Medical Illness: <https://studentservices.uwo.ca/secure/index.cfm>.

All non-medical absences must be approved in advance. In the case of an unexpected absence on compassionate grounds, documentation may be requested. If documentation is required by the instructor for either medical or non-medical academic accommodation, then such documentation must be submitted by the student directly to the appropriate Faculty Dean's office and not to the instructor. It will be the Dean's office that will determine if accommodation is warranted.

Statement on Academic Offences

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_grad.pdf.

All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (<http://www.turnitin.com>).

Statement on Copyright and Audio/Video Recording

Participants in this course are not permitted to record the sessions, except where recording is an approved accommodation, or the participant has the prior written permission of the instructor. You must always ask permission to record another individual and you should never share or distribute recordings.

Course material produced by faculty is copyrighted and to reproduce this material for any purposes other than your own educational use contravenes Canadian Copyright Laws.

Support Services

As part of a successful student experience at Western, we encourage students to make their health and wellness a priority. Western provides several on campus health-related services to help you achieve optimum health and engage in healthy living while pursuing your degree. For example, to support physical activity, all students, as part of their registration, receive membership in Western's Campus Recreation Centre. Numerous cultural events are offered throughout the year. Please check out the Faculty of Music web page <http://www.music.uwo.ca/>, and our own McIntosh Gallery <http://www.mcintoshgallery.ca/>.

Registrarial Services: <http://www.registrar.uwo.ca>

USC Student Support Services: <http://westernusc.ca/services/>

Academic Support and Engagement: <http://academicsupport.uwo.ca/>

SGPS Life & Community web page: https://grad.uwo.ca/life_community/self/index.html

Students seeking help regarding mental health concerns are advised to speak to someone they feel comfortable confiding in, such as their faculty supervisor, their program director (Graduate Chair), or other relevant administrators in their unit. Health and Wellness-related information and services are available at <https://www.uwo.ca/health/>.

Students who are in emotional/mental distress should refer to Mental Health@Western <https://www.uwo.ca/health/> for a complete list of options about how to obtain help.

Accessible Education Western (AEW)

Western is committed to achieving barrier-free accessibility for all its members, including graduate students. As part of this commitment, Western provides a variety of services devoted to promoting, advocating, and accommodating persons with disabilities in their respective graduate program.

Graduate students with disabilities (for example, chronic illnesses, mental health conditions, mobility impairments) are strongly encouraged to register with Accessible Education Western (AEW), a confidential service designed to support graduate and undergraduate students through their academic program. With the appropriate documentation, the student will work with both AEW and their graduate programs (normally their Graduate Chair and/or Course instructor) to ensure that appropriate academic accommodations to program requirements are arranged. These accommodations include individual counselling, alternative formatted literature, accessible campus transportation, learning strategy instruction, writing exams and assistive technology instruction.

More information and access to services is available on the AEW website:
http://academicsupport.uwo.ca/accessible_education/index.html

Department & Faculty Offices

The Department of Epidemiology and Biostatistics is located on the third floor of the Western Centre for Public Health & Family Medicine (PHFM) on Western University's Main Campus. For undergraduate academic counselling assistance, students will need to speak with the Bachelor of Medical Sciences Office: <http://www.schulich.uwo.ca/bmsc/general-counselling>.

Technology Requirements

You are responsible for all required course materials and announcements posted to the course's OWL website. Please ensure after the first class that when you log in you are able to access the course site. A copy of the course outline will be available on both OWL and the departmental website.