Department of Epidemiology and Biostatistics

Biostatistics 9651U
Multi-level Modeling
Summer 2023

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

Instructor: Yun-Hee Choi
Office Hours: By appointment
E-mail: ychoi97@uwo.ca

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
Course Content and Schedule

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<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Textbook Chapter</th>
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<tr>
<td>1</td>
<td>May 2</td>
<td>Introduction to multi-level data structure</td>
<td>Chapter 1</td>
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<td>May 4</td>
<td>Multi-level models</td>
<td>Chapter 2</td>
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<td>2</td>
<td>May 9</td>
<td>Fitting two-level models in R</td>
<td>Chapter 3</td>
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<td>May 11</td>
<td>Models for three and more levels</td>
<td>Chapter 4</td>
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<td>3</td>
<td>May 16</td>
<td>Graphing data</td>
<td>Chapter 4</td>
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<td>May 18</td>
<td>Longitudinal data analysis</td>
<td>Chapter 5</td>
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<td>May 23</td>
<td>Generalized linear models</td>
<td>Chapter 7</td>
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<td>May 25</td>
<td>Multi-level generalized linear models</td>
<td>Chapter 8</td>
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<td>5</td>
<td>June 1</td>
<td>Final Project Due</td>
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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 1, 2023)

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

Absence from Course Commitments
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 for either medical or non-medical academic accommodation, then such documentation must be submitted by the student to the instructor.

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: https://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).

Computer-marked multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

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/. Information regarding health- and wellness-related services available to students may be found at http://www.health.uwo.ca/

Registrarial Services: http://www.registrar.uwo.ca
USC Student Support Services: http://westernusc.ca/services/
Student Development Centre: http://www.sdc.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.

Western is committed to reducing incidents of gender-based and sexual violence and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced sexual or gender-based violence (either recently or in the past), you will find information about support services for survivors, including emergency contacts at https://www.uwo.ca/health/student_support/survivor_support/get-help.html. To connect with a case manager or set up an appointment, please contact support@uwo.ca.

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.

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.

Cell Phone and Electronic Device Policy
The Schulich School of Medicine & Dentistry is committed to ensuring that testing and evaluation are undertaken fairly across all our departments and programs. For all tests and exams, it is the policy of the School and the Department of Epidemiology and Biostatistics that any electronic devices, i.e., cell phones, tablets, cameras, or iPod are strictly prohibited. These devices MUST be left either at home or with the student’s bag/jacket at the front of the room and MUST NOT be at
the test/exam desk or in the individual’s pocket. Any student found with one of these prohibited devices will receive a grade of zero on the test or exam. Non-programmable calculators are only allowed when indicated by the instructor. The Department of Epidemiology and Biostatistics is not responsible for stolen/lost or broken devices.