

Department of Epidemiology and Biostatistics
Epidemiology 9582T – Meta-Analysis
Winter 2020

Class: Tuesdays 1:30 to 3:30 pm (MSB 190)

Lab: Thursdays 2:30 to 3:30 pm (K7)

Dates: February 25 to April 2

TA: TBD

Instructors: Dr. Monali Malvankar (ext. 61288)

(monali.malvankar@sjhc.london.on.ca)

Office Hours: After class or by appointment

Course Information

Pre-Requisites: Epi 9580S - Systematic Reviews

Unless you have the requisites for this course or written permission from the Undergraduate Chair to enroll, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

Course Syllabus

Meta-analysis is used in every field including education, psychology, criminology, business, and ecology. Pharmaceutical companies use meta-analysis to synthesis evidence from a series of studies to assess the efficacy of a drug. This course will cover the details of the process of conducting a meta-analysis, discuss strengths and limitations of the methods, and give step-by-step guidance on how to perform a meta-analysis, sub-group analysis, and meta-regression.

Learning Outcomes:

By the end of this course, students will be able to:

- Examine various elements of meta-analysis including effect size, various types of data associated with effect size.
- Examine how the results from a study can be summarized with various effect size or outcome measures.
- Acquire techniques for conducting meta-analyses, including fixed-effect and random-effects models.
- Recognize various types of heterogeneity.

- Design forest plots and funnel plots.
- Examine when and how to perform a sub-group analysis and recognize various statistical issues related to sub-group analysis.
- Acquire techniques for conducting meta-regression.
- Acquire knowledge about STATA 15.0

Weekly Topics:

Week	Date	Class (Tuesday)	Lab (Thursday)
1	February 25 to 27	Introduction to Meta-Analysis - Treatment effect and effect size - Effect sizes based on types of data - Converting among effect sizes	Introduction to STATA - Basic commands - Meta-analysis commands
2	March 3 to 5	Fixed-effect and Random-effects Model - The true effect size - Performing a fixed-effect meta-analysis - Performing a random-effects meta-analysis	Meta-analysis using STATA - Meta-analysis commands - Fixed-effect model in STATA
3	March 10 to 12	Presentations	- Random-effects model in STATA
4	March 17 to 19	Sub-group Analyses Part I - Fixed-effect model within subgroups - Random-effects model	- Subgroup Analysis in STATA
5	March 24 to 26	Sub-group Analysis Part II - Random-effects model Meta-regression	- Meta-regression in STATA
6	March 31 to April 2	Publication Bias Reporting Meta-Analysis Results	- Summarize meta-analysis results - Funnel Plots in STATA

Course Structure:

The class sessions (Tuesdays) will cover key information on how to conduct a meta-analysis, and lab sessions (Thursdays) will allow students to work on these skills in a supported environment. It should be noted that this course requires a significant amount of independent work, but it is intended to be highly practical and will prepare you to conduct meta-analysis. Over the course of seven weeks, you will learn why, when, and how to conduct a meta-analysis, sub-group analysis, and meta-regression.

Course Materials

Required Texts:

Introduction to Meta-Analysis, by Borenstein M., Hedges L., Higgins J., Rothstein H., 5th edition. (Wiley-Blackwell, 2011).

Link: <http://ca.wiley.com/WileyCDA/WileyTitle/productCd-EHEP002313.html>

Chapters 1 – 7, Chapters 10 – 16, Chapters 19 – 21, and Chapter 30 and 41.

Meta-analysis in Stata, by Sterne J. (Stata Press, 2009)

Link: <http://www.stata.com/bookstore/meta-analysis-in-stata/>

Chapters 1 – 3.

Other Reference Texts:

Higgins JPT, Thomas J (Editors). *Cochrane Handbook for Systematic Reviews of Interventions*. Version 6 (2019). The Cochrane Collaboration, 2019.

Download Available From: <https://training.cochrane.org/handbook/current>

Systematic Reviews in Health Care: Meta-Analysis in Context, by Egger M., Smith G., Altman D., Second Edition, BMJ books.

Link: <http://ca.wiley.com/WileyCDA/WileyTitle/productCd-072791488X.html>

Meta-Analysis, Decision Analysis, Cost-Effectiveness Analysis, by Petitti DB., 2nd edition. Oxford University Press, 2000.

Link: <http://www.oxfordscholarship.com/view/10.1093/acprof:oso/9780195133646.001.0001/acprof-9780195133646>

Additional readings will be posted to OWL.

Methods of Evaluation

A. Participation (15% of final grade)

- Students are expected to attend and actively participate in all class discussions and labs.
- Note that participation will be assessed on a weekly basis based on student's involvement in solving in-class examples as well as examples in labs. Each in-class examples and examples solved in labs will carry 1% participation mark, totaling to 15% by the end of the term.
- Absences without a valid reason will be assigned a mark of zero.

B. Presentation (20% of final grade)

- Each student will prepare a brief 3-5 mins presentation on their respective projects including background/rationale, research question, data extracted, meta-analysis plan (optional)
- **Due: Thursday March 10 at the start of class**

C. Assignments (20% of final grade)

- Meta-Analysis Assignment #1
 - **Due: Thursday March 19 at the start of class**
- Meta-Analysis Assignment #2
 - **Due: Thursday March 26 at the start of class**

D. Final Assignment (45% of final grade)

- **Due: April 23, 2019 before mid-night**

Late Assignment Policy

Please negotiate an alternative deadline with the instructor in advance if you foresee difficulties meeting the assigned due dates.

Marking Reassessments

Should you have concerns about a mark you have received on an assignment, you are welcome to request a reassessment from the instructor. In order to request a reassessment, please write one paragraph explaining why you believe you deserve a different mark from the one that you received. This will be read in conjunction with your original submission. The instructor will reassess your assignment based on this information. Requests for changes in marking made in any other manner will not be considered.

Policy on Accommodation for Medical and Non-Medical Absences

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>).

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 or undergraduate chair), or other relevant administrators in their unit.

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

Student Accessibility Services

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 encouraged to register with Student Accessibility Services, a confidential service designed to support graduate and undergraduate students through their academic program. With the appropriate documentation, the student will work with both SAS 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.

Department & Faculty Offices

The Epidemiology & Biostatistics main office is located in K201 in the Kresge Building on main campus.

Technology Requirements

You are responsible for all required course materials and announcements posted to the course's OWL website. Please ensure 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.

Students will also use the following software or online platforms throughout the course (all available free of charge):

- Covidence: used for study screening (online)

<http://www.covidence.org>

- Mendeley: citation management software
<http://www.mendeley.com>
- Review Manager (RevMan 5.3.5): used for data extraction and to create summary tables
<http://tech.cochrane.org/revman/download>
- GRADEpro: used for GRADE evidence tables and summary of finding tables
<https://gradepro.org>
- STATA 15.0: statistical software
STATA: <https://www.stata.com/>