Department of Epidemiology and Biostatistics
Epidemiology 3330G – Systematic Reviews and Meta-Analysis
Winter 2019

Class: Tuesdays 1:30 to 3:30 pm (MSB 190)  
Lab: Thursdays 1:30 to 2:30 pm (K7)  
Dates: January 8 to April 4  
TA: Sarah Singh (ssing452@uwo.ca)

Instructors: Dr. Kelly Anderson  
(kelly.anderson@schulich.uwo.ca)  
Dr. Monali Malvankar (ext. 61288)  
(monali.malvankar@sjhc.london.on.ca)

Office Hours: After class or by appointment

Course Information

Pre-Requisites: Epidemiology 3200A, Biostatistics 3100A
Unless you have the prerequisites 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

Systematic reviews form the core of evidence-based decision-making in health care and are based on reliable syntheses of research and information. This course will cover the theory and rationale behind systematic reviews, discuss the strengths and limitations of the method, and provide step-by-step guidance on how to actually perform a systematic review. This course will also 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.

Learning Outcomes:
By the end of this course, students will be able to:
• Recognize different types of literature reviews and how they are used in health care decision making
• Develop a systematic review protocol that clearly defines the study objectives and search strategy
• Conduct the literature search, study screening, data extraction, and quality assessment
• Acquire techniques for conducting meta-analyses, including fixed- and random-effect models, heterogeneity, forest plots, and funnel plots
• Write-up a systematic review and meta-analysis manuscript
**Weekly Topics:**

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Class (Tuesday)</th>
<th>Lab (Thursday)</th>
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<tbody>
<tr>
<td>1</td>
<td>January 8 to 10</td>
<td><strong>Introduction to Systematic Reviews</strong></td>
<td>Finalize the Research Question</td>
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<td></td>
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<td>- Defining the Research Question</td>
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<td>- Developing a Review Protocol</td>
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<td>2</td>
<td>January 15 to 17</td>
<td><strong>Developing a Search Strategy</strong></td>
<td>Finalize the Search Strategy</td>
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<td>- Database and Grey Literature Searches</td>
<td>Introduction to Covidence</td>
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<td>- Forward and Backward Citation Tracing</td>
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<td>3</td>
<td>January 22 to 24</td>
<td><strong>Study Screening</strong></td>
<td>Work on Study Screening</td>
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<td>- Levels of Screening</td>
<td>Introduction to Mendeley</td>
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<td>- Setting Inclusion and Exclusion Criteria</td>
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<td>4</td>
<td>January 29 to 31</td>
<td><strong>Data Extraction</strong></td>
<td>Create Data Extraction Form</td>
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<td>- Developing Data Extraction Template</td>
<td>Introduction to RevMan</td>
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<td>- Handling of Missing Data</td>
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<td>5</td>
<td>February 5 to 7</td>
<td><strong>Quality Assessment</strong></td>
<td>Work on Data Extraction and Quality Assessment</td>
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<td>- Risk of Bias</td>
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<td>- GRADE</td>
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<td>6</td>
<td>February 12 to 14</td>
<td><strong>Reporting Systematic Reviews</strong></td>
<td>Summarize Review Findings</td>
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<td>- Qualitative Synthesis of Findings</td>
<td>Work on Final Report</td>
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<td>- Reporting Guidelines</td>
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<td>7</td>
<td>February 19 to 21</td>
<td>Reading Week – No Class</td>
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<td>8</td>
<td>February 26 to 28</td>
<td><strong>Introduction to Meta-Analysis</strong></td>
<td>Introduction to STATA</td>
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<td>- Treatment effect and effect size</td>
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<td>- Effect sizes based on types of data</td>
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<td>- Converting among effect sizes</td>
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<td>9</td>
<td>March 5 to 7</td>
<td><strong>Fixed-effect and Random-effects Model</strong></td>
<td>Meta-analysis using STATA</td>
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<td>- The true effect size</td>
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<td></td>
<td>- Performing a fixed-effects and random-effects meta-analysis</td>
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<td>10</td>
<td>March 12 to 14</td>
<td><strong>Presentations</strong></td>
<td>Solve meta-analysis example in STATA - I</td>
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<td>11</td>
<td>March 19 to 21</td>
<td><strong>Sub-group Analyses</strong></td>
<td>Solve meta-analysis example in STATA-II</td>
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<td>- Fixed-effect model within subgroups</td>
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<td>- Random-effects model</td>
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<td>12</td>
<td>March 26 to 28</td>
<td><strong>Meta-regression</strong></td>
<td>Work on meta-analysis for your respective project</td>
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<td>April 2 to 4</td>
<td><strong>Reporting Meta-Analysis Results</strong></td>
<td>Summarize meta-analysis results</td>
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<td>Work on Final Report</td>
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**Course Structure:**

The class sessions (Tuesdays) will cover key information on how to conduct a systematic review and 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 systematic reviews. Over the course of seven weeks, you will plan, conduct, and report a rigorous systematic review and meta-analysis on a topic of your choosing. With sufficient planning and effort, your final report may be appropriate for publication in a peer-reviewed journal.

Because of the short time frame of this course, students are **required** to have identified a topic for their project before the start of the term. The topic can be related to the student’s thesis but must not overlap directly. Students are encouraged to consult with the course instructor (Anderson or Malvankar) regarding a suitable topic.

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**Course Materials**

**Required Texts:**
Download Available from the UWO Library: [https://www.taylorfrancis.com/books/9781853157998](https://www.taylorfrancis.com/books/9781853157998)


**Other Reference Texts:**
Download Available From: [http://www.cochrane-handbook.org](http://www.cochrane-handbook.org)

Additional readings will be posted to OWL.
Methods of Evaluation

A. Participation (10% of final grade)
   - Students are expected to attend and actively participate in all class discussions and labs.
   - Note that participation will be assessed by the instructor on a weekly basis (rubric available on OWL). Absences without a valid reason will be assigned a mark of zero.
   - Students can also participate by providing suggestions and feedback on their classmates’ journal entries on OWL.

B. Weekly Journal Entries (10% of final grade)
   - At the end of each week, students are expected to provide an update on their progress for the week’s tasks in the forum on OWL, including specific details of the task (e.g. finalized research question, results of screening) and any issues they may be encountering.
   - Journal entries will be due on Sunday of each week
   - **Deadlines:**
     Journal Entry #1: Final Research Question – **January 13**
     Journal Entry #2: Search Strategy – **January 20**
     Journal Entry #3: Inclusion and Exclusion Criteria – **January 27**
     Journal Entry #4: Study Screening Results – **February 3**
     Journal Entry #5: Summary of Data Extraction and Quality Assessment – **February 10**

C. Assignments (30% of final grade)
   i. **Review Protocol**
      - Each student will prepare a brief (2 page) protocol outlining the review methods, including a brief background/rationale, research question, proposed search strategy, inclusion and exclusion criteria, and key variables for data extraction
      - **Due: Tuesday January 29 at the start of class**
   ii. **Meta-Analysis Assignment #1**
      - **Due: Thursday March 21 at the start of class**
   iii. **Meta-Analysis Assignment #2**
      - **Due: Thursday March 14 at the start of class**

D. Presentation (5% of final grade)
   - Each student will prepare a brief 5 mins presentation on their respective projects including background/rationale, research question, data extracted, meta-analysis plan (optional)
   - **Due: Due: Thursday March 12 at the start of class**
E. **Final Essay (45% of final grade)**
   - Students will prepare a final report for their systematic review and meta-analysis in the style of a journal manuscript
   - **Due: April 22, 2019**

**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**

The University’s policy on accommodation for medical illness may be found at: [http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_illness.pdf](http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_illness.pdf).

The University policy on accommodation for medical illness states that “in order to ensure fairness and consistency for all students, academic accommodation for work representing 10% or more of the student’s overall grade in the course shall be granted only in those cases where there is documentation indicating that the student was seriously affected by illness and could not reasonably be expected to meet his/her academic responsibilities. Documentation shall be submitted, as soon as possible, to the appropriate Dean’s office....” (i.e., the Associate Dean, Graduate Studies). Accommodation for work representing less than 10% of the student’s overall grade is at the discretion of the course instructor.

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

The final report will 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 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/

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. Campus mental health resources may be found at http://www.health.uwo.ca/mental_health/resources.html

To help you learn more about mental health, Western has developed an interactive mental health learning module, found here: http://www.health.uwo.ca/mental_health/module.html. This module is 30 minutes in length and provides participants with a basic understanding of mental health issues and of available campus and community resources. Topics include stress, anxiety, depression, suicide and eating disorders. After successful completion of the module, participants receive a certificate confirming their participation.
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](http://www.covidence.org)
- Mendeley: citation management software  
  [http://www.mendeley.com](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](http://tech.cochrane.org/revman/download)
- GRADEpro: used for GRADE evidence tables and summary of finding tables  
  [https://gradepro.org](https://gradepro.org)
- STATA 15.0: statistical software  
  STATA: [https://www.stata.com/](https://www.stata.com/)