M19-551 Systematic Reviews and Meta-Analysis in Public Health and Clinical Medicine

Spring 2019
Fridays, 9:00 am to 12:00 pm
Location: Taylor Avenue Building
2nd floor, Richmond Room

INSTRUCTORS
Graham A. Colditz, MD, colditzg@wustl.edu
Carrie Stoll, MSW, MPH, class resource/teaching assistant Carolyn.stoll@wustl.edu

OFFICE HOURS
By appointment and after class

PREREQUISITES
Introductory epidemiology and biostatistics 1 (or permission of the course master)

TARGET AUDIENCE
Clinicians interested in conducting research synthesis or meta-analysis to inform practice or policy, clinical training program participants, students enrolled in Genetic Epidemiology Master of Science program, students in MPH addressing application of epidemiologic data to prevention. Prior clinical or community research experience is helpful but not required.

COURSE DESCRIPTION & OBJECTIVES
Introduction to the use of meta-analysis and related methods used to synthesize and evaluate epidemiological and clinical research in public health and clinical medicine. Concepts introduced and illustrated through case studies of public health and medical issues.

Objectives are to learn how to use a variety of formal and informal methods for synthesizing epidemiological information on public health risks, to understand how to use these methods to assess the strength of the evidence in policy development and clinical contexts, and to appreciate how research synthesis can contribute to rational policy making in controversial areas.

COMPETENCIES
Ability to design research synthesis and meta-analysis
- Define research question
- Define literature search strategy
- Conduct literature search and document the process
- Apply eligibility criteria, data extraction, and data quality scoring
- Develop data analysis plan
- Understand and interpret fixed-effects, random-effects, and meta-regression methods and results
- Recognize heterogeneity and approaches to quantification and reporting of among-study variation

Skills and experience to conduct analysis
• Master data analysis and model fitting in context of meta-analysis
• Quantitatively evaluate publication bias
• Be able to estimate combined results from reports of randomized trials, observational studies, and diagnostic test

Master the core reporting strategies
• Master reporting standards for RCTs and observational data in context of meta-analysis
• Master forest plot, summary tables, and publication bias presentations

Draw inferences from data to inform clinical and public health practices
• Correctly use reasoning for design and methodologies employed
• Present oral and written reports from analyses
• Place inference in context of clinical and public health implications for action and future research

GRADING
Your grade will be based on:
• HW 1: Preliminary topic presentation (10%)
• HW 2: Library assignment (10%)
• HW 3: Analysis in STATA (10%)
• HW 4: Data extraction (10%)
• Final presentation (10%) and paper (50%)

Grading Scale
A+: 97-100; A: 93-96; A-: 90-92; B+: 87-89; B: 83-86; B-: 80-82; C+: 77-79; C: 73-76; C-: 70-72

ATTENDANCE AND PARTICIPATION
Class attendance is required. As a courtesy to other students, you are expected to arrive on time. More than two unexcused absences from class may result in a lowered grade. Readings assigned for each class should be read ahead of the class and students should be prepared to discuss the material from readings.

POLICY ON LATE ASSIGNMENTS
Late assignments will result in a deduction of one grade point (A+ down to A) for each day late (including weekends) unless prior approval is obtained from the instructor or a compelling situation prevents prior approval (i.e. documented health issues or family emergencies).

READINGS

Supplemental readings from Introduction to Meta-Analysis, Michael Borenstein, Larry V Hedges, Julian PT Higgins, and Hannah R Rothstein, Wiley, 2009, are also given. Additional readings are indicated below and will be available through Canvas.

Additional Resources
BMJ methods http://www.bmj.com/search?submit=yes&tocsectionid=Research%20Methods *
ASSIGNMENTS & DUE DATES
Details of all assignments can be found on Canvas

- HW 1: Preliminary topic
  Presented in class on Jan 31
  Slides are due via Canvas by January 29 at 11:59 pm

- HW 2: Library assignment
  Due February 7 by 11:59 pm, submit via Canvas AND email to dathomas@wustl.edu

- HW 3: Analysis in STATA
  Due March 6 by 11:59 pm, submit via Canvas.

- HW 4: Data extraction form
  Presented in class on March 20
  Slides due via Canvas by March 18 at 11:59 pm.

- Final Presentation
  In class on April 24 and May 1. Students will sign up for a date in February.
  Presentation slides are due April 22 and April 29 by 11:59 pm, respectively, via Canvas.

- Final Paper
  Due May 3 by 11:59 pm via Canvas.

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<th>Assignment Due</th>
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<td>Classic article</td>
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Searching the literature

Presentation by Michelle Doering and Angela Hardi from Becker Library


Lemeshow AR, Blum RE, Berlin JA, Stoto MA, Colditz GA. Searching one or two databases was insufficient for meta-analysis of observational studies. J Clin Epidemiol 2005; 58:867-73

Classic article:

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<tr>
<th>Class 3</th>
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<th>Class 4</th>
<th>Feb 7</th>
<th>HW 2: Library Assignment</th>
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<td>Statistical methods: effect sizes, basic meta-analysis calculations</td>
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Additional readings:
Borenstein, Chapters 3-14
Using meta-analysis for research synthesis: pooling data from several studies. Biostatistics in Clinical Medicine, Chapter 14, 332-360.
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<td>March 13</td>
<td>SPRING BREAK</td>
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<td>10</td>
<td>March 20</td>
<td>STUDENT PRESENTATIONS Extraction form</td>
<td>HW 4: Data extraction</td>
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<td>11</td>
<td>March 27</td>
<td>Meta-analysis in STATA Computer Lab 2</td>
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| 12     | April 3  | Analysis combining individual patient data | Cholesterol Treatment Trialists Efficacy and safety of more intensive lowering of LDL cholesterol: a meta-analysis of data from 170,000 participants in 26 randomized trials. Lancet 2010;376:1670-81  
Breast cancer and hormonal contraceptives: collaborative reanalysis of individual data on 53,297 women with breast cancer and 100,238 women without breast cancer from 54 epidemiological studies. Lancet 1996;347:1713-27 |
Golder S, Loke YK, Bland M. Meta-analysis of adverse effects data derived from Randomised controlled trials as compared to observational studies: Methodologic overview. PLOS medicine 2011; 8 e1001026  
Additional reading:  
Stoto MA, Research synthesis for public health policy: Experience of the Institute of Medicine, in Meta-Analysis in Medicine and Health Policy, Stangl D and Berry D., eds., New York: Marcel Dekker, 2000, pp 321-357. |
| 14     | April 17 | Combining diagnostic test results Applying results to policy and practice | Combining Diagnostic Tests  
Example: |

Issues in combining independent estimates of the sensitivity and specificity of a diagnostic test.
Shapiro DE. Acad Radiol 1995;2:S37-S47.

Rutter CM, Gatsonis CA Regression methods for meta-analysis of diagnostic test data.

Further reading on this topic see Rutter CM, Gatsonis CA http://onlinelibrary.wiley.com/doi/10.1002/sim.942/abstract


Examples:

Kwok Y et al., Meta-analysis of exercise testing to detect coronary artery disease in women, American Journal of Cardiology 1999; 83: 660-666.

Additional reading:

Applying results to policy and practice

Ioannidis J, Karassa F. The need to consider the wider agenda in systematic reviews and meta-analysis. BMJ 2010;341:762-65


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<th>Class 15</th>
<th>April 24</th>
<th>Final presentations</th>
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<td>Class 16</td>
<td>May 1</td>
<td>Final presentations</td>
<td>Final paper due</td>
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CLASS PUBLICATIONS
Many students go on to publish based on the work they performed in this class. Since 2011, the following publications have been produced by participants in this class:

- Cheng SY, Davis M, Jonson-Reid M, Yaeger L. Compared to what? A meta-analysis of batterer intervention studies using nontreated controls or comparisons. Trauma, Violence, & Abuse. 2019


**DROP DATES**

You may drop for any reason during the course of the semester. However, you may only receive a partial or no tuition reimbursement depending upon how far into the semester you drop the course. See the [MPHS Student Handbook](#). Late withdrawals will appear on your transcript as a withdrawal.

**MPHS Academic Policy Guidelines:**

Guidelines regarding MPHS course registration and enrollment, grades, tuition obligation, and academic leave are consolidated in the [MPHS Student Handbook](#). Please review this document.

**MPHS Guidelines for Academic and Non-Academic Transgressions:**

By registering for this course you have agreed to the terms of the [MPHS Academic Integrity Policy](#), outlined below and in more detail in the [MPHS Student Handbook](#). Please review this policy before submitting your first graded assignment.

**Academic Integrity/Plagiarism Policy:**

- Academic dishonesty is a serious offense that may lead to probation, suspension, or dismissal from the University. Academic dishonesty includes plagiarism (the use of someone else’s ideas, statements, or approaches without proper citation). Academic dishonesty also includes copying information from another student, submitting work from a previous class for a new grade without prior approval from your instructor, cheating on exams, etc. You are responsible for reviewing WashU’s academic integrity resources to become aware of all the actions that constitute academic dishonesty.

- All instances of academic dishonesty will be reported to the Office of the Registrar for investigation and potential disciplinary action. In addition, the instructor will make an independent decision about the student’s grade on any assignment in question. The MPHS process regarding academic dishonesty is described in the [MPHS Student Handbook](#).

**DISABILITY RESOURCES**

It is the goal of Washington University to assist students with disabilities in removing the barriers their disabilities may pose and provide support in facing the challenge of pursuing an education at Washington University.
Washington University recognizes and accepts its professional, legal and moral responsibility to avoid discrimination in the acceptance and education of qualified students with disabilities and to provide reasonable accommodations to such students consistent with the principles embodied in the law. These guidelines apply to students seeking admittance as well as to those who become disabled while they are enrolled.

Washington University makes every effort to insure that all qualified applicants and students can participate in and take full advantage of all programs and opportunities offered within the university. Washington University encourages and gives full consideration to all applicants for admission. Washington University does not discriminate in access to its programs and activities on the basis of age, sex, sexual orientation, race, disability, religion, color or national origin.

To learn more about services provided to students with disabilities, initiate the process of formal documentation and/or to arrange for accommodations, please review the Disability Resources for the Med School at the start of the course.

**MENTAL HEALTH RESOURCES**
Mental Health Services’ professional staff members work with students to resolve personal and interpersonal difficulties, many of which can affect the academic experience. These include conflicts with or worry about friends or family, concerns about eating or drinking patterns, and feelings of anxiety and depression. See: shs.wustl.edu/MentalHealth.

**SEXUAL ASSAULT RESOURCES**
You can also speak confidentially and learn about available resources by contacting Dr. Gladys Smith, PhD, Sexual Violence Prevention Therapist and Licensed Psychologist at the Medical Campus, (314) 362-2404. Additionally, you can report incidents to the Office of Student Affairs or by contacting WUSM Protective Services 314-362-4357 or your local law enforcement agency.

**BIAS RESOURCES**
The University has a process through which students and staff who have experienced or witnessed bias, prejudice or discrimination against a student can report their experiences to the University’s Bias Report and Support System (BRSS) team. For details see: diversityinclusion.wustl.edu/brss/.

**Office of the Associate Vice Chancellor for Diversity, Equity and Inclusion (DEI)**
The DEI Training Team designs, facilitates and leads diversity education programming for faculty, staff and students on a wide range of topics including: creating a climate of respect, the value of diversity and the role of biases in our day-to-day lives. diversity.med.wustl.edu/training/

**The Office of Diversity Programs** promotes diversity among and prepares medical students to lead in a global society. A priority for the Office of Diversity Programs is to cultivate and foster a supportive campus climate for students of all backgrounds, cultures and identities. mddiversity.wustl.edu/

**The Diversity and Inclusion Student Council** promotes an inclusive campus environment for all School of Medicine students. sites.wustl.edu/disc/
The Office for International Students and Scholars embraces the university’s mission of welcoming promising students from around the world.

wumma.wustl.edu/