

M19-502 Intermediate Clinical Epidemiology (3 credits)

Fall 2 2023 (10/24/23 – 12/14/23)

Tuesday & Thursday, 9 AM – 12 PM

Doll & Hill, Taylor Avenue Building

INSTRUCTORS

Instructor

Yin Cao, ScD, MPH

Associate Professor of Surgery and Medicine

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Teaching Assistant

Ruiyi Tian, MPH, PhD candidate

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Mengyao Shi, MBBS, MPH

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Office hours

After lectures or by appointment

GUEST SPEAKERS

Graham Colditz, Professor of Surgery; Chief, Division of Public Health Sciences

Fei Wan, Associate Professor of Surgery; Division of Public Health Sciences

Aaloke Mody, Assistant Professor of Medicine, Division of Infectious Diseases

Yikyung Park, Associate Professor of Surgery; Division of Public Health Sciences

Elizabeth Salerno, Assistant Professor of Surgery; Division of Public Health Sciences

Kelly Bolton, Assistant Professor of Medicine; Department of Medicine

Min Lian, Assistant Professor of Epidemiology and Medicine, Division of General Medical Sciences

Chongliang Luo, Assistant Professor of Surgery; Division of Public Health Sciences

Yan Xie, Head, Division of Pharmacoepidemiology, VA Saint Louis Health Care System

PREREQUISITES

Introduction to R for Clinical Research, Introductory Biostatistics, and Introduction to Clinical Epidemiology. R will be used throughout the course.

COURSE DESCRIPTION & OBJECTIVES

This is the second course in the Epidemiology series which builds upon the basic principles and methods of epidemiology and introduces additional tools and concepts that are critical to a comprehensive understanding of epidemiologic methods and application. In addition, the students will also learn how to leverage existing data for epidemiologic research, state-of-the-art of research in subfields of epidemiology, and the key issues/considerations for leading an epidemiologic study.

Students are expected to complete the assigned reading and lectures, participate in class activities and guest lectures, work in groups, and complete all the assignments in a timely manner.

COMPETENCIES

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

- ✓ Critically interpret epidemiologic studies that apply advanced methods in study design and analyses
- ✓ Employ appropriate epidemiologic methods and statistical programming to conduct an epidemiologic analysis and draft the manuscript in preparation for a peer-reviewed publication
- ✓ Develop an overall understanding of methods/tools from the major subfields of epidemiology and how they can be leveraged in clinical research
- ✓ Understand the key issues/considerations across the full spectrum of leading an epidemiologic study

GRADING

Class participation and attendance (15%)

All students are expected to attend the lectures and actively engage in classroom discussions. Students should be prepared to ask questions, raise concerns, and interact with fellow students during each class. Participation in guest lectures will be recorded.

Mid-term exam (40%)

The mid-term exam will be a take-home exam covering materials from lectures and R lab. It will include hands-on practice of R coding.

Class project (45%)

Students will form groups (up to 2 per group) to conduct an epidemiology analysis, interpret the findings, and write the Abstract in preparation for conference submission. A brief research proposal (10%) (no more than 2 pages) is required. The final report (25%) should include a structured abstract (300 words; Background, Methods, Results, Conclusions) and Tables/Figures. Groups will present their findings (8 min; 10%) on the last day of class. Students could choose from a list of topics/datasets provided or select their own topics/datasets. If the latter, the analyses should not have been done before the course starts.

Grading Scale:

A+	97-100	B+	88-89	C+	78-79	F	≤69
A	93-96	B	84-87	C	73-77		
A-	90-93	B-	80-83	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 the readings.

POLICY ON LATE ASSIGNMENTS

Late assignments will result in a deduction of one grade point (e.g. 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).

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.

Course Schedule:

DATE	TOPIC/ACTIVITY	ASSIGNMENT	READING
10/24 (Tu)	Course introduction Power of descriptive epidemiology		<ul style="list-style-type: none"> Grimes DA, Schulz KF. Descriptive studies: what they can and cannot do. <i>Lancet</i>. 2002;359(9301):145-149. Jemal A, Miller KD, Ma J, et al. Higher lung cancer incidence in young women than young men in the United States. <i>N Engl J Med</i>. 2018;378(21):1999-2009. Yang L, Cao C, Kantor ED, et al. Trends in Sedentary Behavior Among the US Population, 2001-2016. <i>JAMA</i>. 2019;321(16):1587-1597.
	Physical activity: measurement, disease associations, and interventions (Dr. Salerno)		<ul style="list-style-type: none"> Saint-Maurice PF, Troiano RP, Matthews CE, Kraus WE. Moderate-to-Vigorous Physical Activity and All-Cause Mortality: Do Bouts Matter? <i>J Am Heart Assoc</i>. 2018 Mar 22;7(6):e007678.
10/26 (Th)	Power of descriptive epidemiology, cont R lab 1 (datasets)		
10/31 (Tu)	Advanced topics in cohort studies		<ul style="list-style-type: none"> Liu PH, Wu K, Ng K, et al. Association of Obesity With Risk of Early-onset colorectal cancer among women. <i>JAMA Oncol</i>. 2019;5(1):37-44. Arterburn DE, Olsen MK, Smith VA, et al. Association between bariatric surgery and long-term survival. <i>JAMA</i>. 2015;313(1):62-70. Bycroft C, Freeman C, Petkova D, et al. The UK Biobank resource with deep phenotyping and genomic data. <i>Nature</i>. 2018;562(7726):203-209
11/2 (Th)	Advanced topics in case-control studies R lab 2 (logistic regression)	Group sign-up (11/3)	<ul style="list-style-type: none"> Grimes DA, Schulz KF. Compared to what? Finding controls for case-control studies. <i>Lancet</i>. 2005;365(9468):1429-1433. Khera AV, Emdin CA, Drake I et al. Genetic risk, adherence to a healthy lifestyle, and coronary disease. <i>N Engl J Med</i>. 2016 Dec 15;375(24):2349-2358.
11/7 (Tu)	Causal inference, propensity score, and instrument variables		<ul style="list-style-type: none"> Davies NM, Holmes MV, Davey Smith G. Reading Mendelian randomisation studies: a guide, glossary, and checklist for clinicians. <i>BMJ</i>. 2018;362:k601.

	(Dr. Wan)		<ul style="list-style-type: none"> • Vertosick EA, Assel M, Vickers AJ. A systematic review of instrumental variable analyses using geographic region as an instrument. <i>Cancer Epidemiol.</i> 2017;51:49-55.
11/9 (Th)	Epidemiologic evaluation of implementation through natural experiments (Dr. Mody)	Proposal due (11/10)	<ul style="list-style-type: none"> • Cowger TL, Murray EJ, Clarke J, et al. Lifting Universal Masking in Schools - Covid-19 Incidence among Students and Staff. <i>N Engl J Med.</i>2022;10.1056/NEJMoa2211029. • Park JJ, Sommers BD, Humble S, Epstein AM, Colditz GA, Koh HK. Medicaid And Private Insurance Coverage For Low-Income Asian Americans, Native Hawaiians, And Pacific Islanders, 2010-16. <i>Health Aff (Millwood).</i> 2019;38(11):1911-1917. • Mody A, Sikazwe I, Namwase AS, et al. Effects of implementing universal and rapid HIV treatment on initiation of antiretroviral therapy and retention in care in Zambia: a natural experiment using regression discontinuity. <i>Lancet HIV.</i> 2021;8(12):e755-e765.
11/14 (Tu)	Introduction to geospatial epidemiology: methods and applications (Dr. Lian)		<ul style="list-style-type: none"> • Mokdad AH, Dwyer-Lindgren L, Fitzmaurice C, Stubbs RW, Bertozzi-Villa A, Morozoff C, Charara R, Allen C, Naghavi M, Murray CJ. Trends and Patterns of Disparities in Cancer Mortality Among US Counties, 1980-2014. <i>JAMA</i> 2017. Jan 24;317(4):388-406. • Schootman M, Lian M, Deshpande AD, Baker EA, Pruitt SL, Aft R, Jeffe DB. Temporal trends in geographic disparities in small-area breast cancer incidence and mortality, 1988 to 2005. <i>Cancer Epidemiol Biomarkers Prev.</i> 2010 Apr;19(4):1122-31.
11/16 (Th)	Genetic epidemiology & clinical implications (Dr. Bolton)		<ul style="list-style-type: none"> • Bolton, K.L., Ptashkin, R.N., Gao, T. et al. Cancer therapy shapes the fitness landscape of clonal hematopoiesis. <i>Nat Genet</i> 52, 1219–1226 (2020). • Holmes MV, Dale CE, Zuccolo L, InterAct Consortium. Association between alcohol and cardiovascular disease: Mendelian randomisation analysis based on individual participant data. <i>BMJ.</i> 2014 Jul 10;349:g4164. • Paternoster L, Tilling K, Davey Smith G. Genetic epidemiology and Mendelian randomization for informing disease therapeutics: Conceptual and methodological challenges. <i>PLoS Genet.</i> 2017 Oct 5;13(10):e1006944.
11/21 (Tu)	Nutritional epidemiology (Dr. Park)	Take-home exam (11/18-22)	

11/23 (Th)	<i>No class, Thanksgiving holiday</i>		
11/28 (Tu)	R lab 3		
11/30 (Th)	Future of clinical epidemiology (Dr. Colditz)		<ul style="list-style-type: none"> Dzau VJ, Balatbat CA, Ellaissi WF. Revisiting academic health sciences systems a decade later: discovery to health to population to society. Lancet. 2021;398(10318):2300-2304.
12/5 (Tu)	Real-world evidence, electronic health record and data integration (Dr. Luo)		
12/7 (Th)	Clinical research leveraging the VHA database (Dr. Xie)		
12/12 (Tu)	Final project presentation	Final report due 12/15	

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.

mdiversity.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/