SYLLABUS & COURSE INFORMATION

SCHOOL OF PUBLIC HEALTH
UNIVERSITY OF MINNESOTA

PUBH 6342

Epidemiologic Methods II
Spring 2018

COURSE & CONTACT INFORMATION

Credits: 3
Meeting Day(s): Tuesdays and Thursdays
Meeting Time: 4:00-5:15 pm
Meeting Place: 1-450 Moos Tower

Instructor: Jim Pankow, PhD, MPH
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COURSE DESCRIPTION

This intermediate course covers methods and techniques for designing, implementing, analyzing, and interpreting observational epidemiologic studies, including cohort, case-control, and cross-sectional studies. It is the second course in a three course sequence (PubH 6341, 6342, 6343) on the theory and practice of epidemiology. This course is designed primarily for MPH students majoring in epidemiology. Students from other programs, particularly those who seek a more in-depth coverage of epidemiologic concepts and methods beyond those provided by an introductory course, are also welcome to enroll. Students primarily interested in the design and analysis of experimental studies are encouraged to take PubH 7420 (Clinical Trials: Design, Implementation, and Analysis) or PubH 7415 (Introduction to Clinical Trials).

Acknowledgments
Epidemiologic Methods 2 is developed by Jim Pankow and Rachel Widome. Drs. Claudia Muñoz-Zanzi and Eyal Shahar have also contributed substantially to the evolution of the course. Additionally, the instructors would like to acknowledge the work of our former TAs in assisting with the refinement of how Epi Methods 2 has been taught over the years.

COURSE PREREQUISITES

a. Epidemiologic Methods I (PubH 6341; grade of B- or higher), Fundamentals of Epidemiology (PubH 6320; grade of A- or higher), or equivalent
b. Biostatistics I (PubH 6450; grade of B- or higher), Biostatistical Literacy (PubH 6414; grade of B- or higher), or equivalent

*Students who wish to proceed to Epidemiologic Methods III (PubH 6343) should note that Biostatistics II (PubH 6451) is a prerequisite for that course.

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COURSE GOALS & OBJECTIVES

As a result of this course, students will be able to:

1. Develop procedures for subject selection and recruitment, including sampling and methods to enhance participation rates and response.
2. Apply principles of observational study design, including variants of the case-control design, use of matching, and sample size and power calculations.
3. Select and develop appropriate exposure and outcome measurement procedures, including questionnaires, interviews, collection of biological specimens, physical measurements, and quality control and assurance methods.
4. Apply principles of observational study analysis, with an emphasis on tabular methods.
5. Identify major sources of bias (i.e., information, selection, and confounding bias) in observational epidemiologic studies and ways to evaluate their likely direction, magnitude, and nature of their threat to causal inference.
6. Apply strategies to assess joint effects of exposures.
7. Apply epidemiologic study designs and methods in public health surveillance and evaluation of screening.
8. Evaluate epidemiologic methods through critical review of published epidemiologic research.

METHODS OF INSTRUCTION AND WORK EXPECTATIONS

Course Workload Expectations

Epidemiologic Methods 2 is a 3-credit course. The University expects that for each credit, you will spend a minimum of three hours per week attending class or comparable online activity, reading, studying, completing assignments, etc. over the course of a 15-week term in order to earn an average grade.

Learning Community

School of Public Health courses ask students to discuss frameworks, theory, policy, and more, often in the context of past and current events and policy debates. Many of our courses also ask students to work in teams or discussion groups. We do not come to our courses with identical backgrounds and experiences and building on what we already know about collaborating, listening, and engaging is critical to successful professional, academic, and scientific engagement with topics.

In this course, students are expected to engage with each other in respectful and thoughtful ways.

In group work, this can mean:

- Setting expectations with your groups about communication and response time during the first week of the semester (or as soon as groups are assigned) and contacting the TA or instructor if scheduling problems cannot be overcome.
- Setting clear deadlines and holding yourself and each other accountable.
- Determining the roles group members need to fulfill to successfully complete the project on time.
- Developing a rapport prior to beginning the project (what prior experience are you bringing to the project, what are your strengths as they apply to the project, what do you like to work on?)

In group discussion, this can mean:

- Respecting the identities and experiences of your classmates.
- Avoid broad statements and generalizations. Group discussions are another form of academic communication and responses to instructor questions in a group discussion are evaluated. Apply the same rigor to crafting discussion posts as you would for a paper.
- Consider your tone and language, especially when communicating in text format, as the lack of other cues can lead to misinterpretation.

Like other work in the course, all student to student communication is covered by the Student Conduct Code (https://z.umn.edu/studentconduct).

Moodle Discussion Board

One way to engage our learning community is by posting questions about the course assignments and materials in the "Q&A Discussion Forum" near the top of the Moodle course site. The instructors and teaching assistant will monitor the discussion forum to answer questions, but active discussion between students is encouraged as well. By posting in the discussion forum everyone in the class can benefit from your questions and any following discussion.

Out-of-Class Meetings

To meet with the instructors outside of class time or our regularly scheduled office hours, it is best to arrange an appointment. At times, we may be able to talk with you in our office at the spur of the moment outside of office hours. But often it is difficult for us to fit an impromptu meeting into our days, so scheduling usually works best.

COURSE TEXT & READINGS

The course does not have a required text. We have assigned a number of chapters from Hulley SB, Cummings SR, Browner WS, Grady DG, Newman TB. Designing Clinical Research (4th ed). Readings from Hulley and other sources are provided through links on the course's Moodle site.

COURSE OUTLINE/WEEKLY SCHEDULE

The first half of the semester will focus on minimizing error in study design and analysis. The second half of the semester will focus on practical application. We will also cover some special topics, including methodological innovations (e.g., Mendelian randomization; building risk prediction models) and important issues for practicing epidemiologists (e.g., screening; public health surveillance; communicating epidemiologic ideas and findings; translating epidemiologic findings into policy).

Class - Date	Topic / *Instructors*	Readings	Due
Class 1 - 22 Jan	• Introduction to course, review of epi terms and concepts *Pankow*	• Hulley SB, Cummings SR, Browner WS, Grady DG, Newman TB. Designing Clinical Research, 4th ed., Chapter 1: **Getting started: the anatomy and physiology of clinical research**.	
Class 2 - 24 Jan	• Drawing causal models as a tool to identify confounding *Pankow*	• Suttorp MM, et al. **Graphical presentation of confounding in directed acyclic graphs.** Nephrol Dial Transplant 2015; 30: 1418-1423.	
Class 3 - 29 Jan	• Strategies to address confounding *Widome*	• Hulley, Chapter 9: **Enhancing causal inference in observational studies**, p. 122-132. • Tripepi G, et al. **Stratification for confounding - part 1: the Mantel-Haenszel formula**. Nephron Clin Pract 2010; 116: c317-c321.	
Class 4 - 31 Jan	• WORKSHOP 1 – Confounding *Pankow/Widome/TAs*		
Class 5 - 5 Feb	• Tabular methods *Widome*	• Pearce N. **Effect measures in prevalence studies**. Environ Health Perspect 2004; 112: 1047-1050.	
Class 6 - 7 Feb	• Strategies to address effect modification *Widome*	• Knol MJ, Egger M, Scott P, Geerlings MI, Vandenbroucke JP. **When one depends on the other: reporting of interaction in case-control and cohort studies**. Epidemiology 2009; 20: 161-166. • Knol MJ, et al. **Recommendations for presenting analyses of effect modification and interaction.** Int J Epidemiol 2012; 1-7. • Knol MJ, et al. **The (mis)use of overlap of confidence intervals to assess effect modification**. Eur J Epidemiol 2011; 26: 253-254.	**Workshop 1**
Class 7 - 12 Feb	• WORKSHOP 2 - Effect modification *Pankow/Widome/TAs*		
Class 8 - 14 Feb	• Strategies to address selection & information bias *Pankow*	• Lash TL, Fox MP, Fink AK. **Applying quantitative bias analysis to epidemiologic data**. Chapter 2: A guide to implementing quantitative bias analysis. • Strassle PD, et al. **What we don't know can hurt us: nonresponse bias assessment in birth defects research**. Birth Defects Research (Part A): 103: 603-609.	

Class 9 - 19 Feb	• WORKSHOP 3 – Bias *Pankow/Widome/TAs*		**Workshop 2**
Class 10 - 21 Feb	• Study design: sampling methods; utilizing cross-sectional and cohort designs *Pankow*	• Hulley, Chapter 7**: Designing cross-sectional and cohort studies**. • Rothman KJ, Gallacher JE, Hatch EE. **Why representativeness should be avoided.** Int J Epidemiol 2013; 42: 1012-1014. • Hulley SB, Cummings SR, Browner WS, Grady DG, Newman TB. Designing Clinical Research (4th ed), Chapter 3: **Choosing the study subjects: specification, sampling, & recruitment.**	
Class 11 - 26 Feb	• Study design: the many variations of the case-control design *Pankow*	• Hulley, Chapter 8: **Designing case-control studies**. • Pearce N. **What does the odds ratio estimate in a case-control study?** International Journal of Epidemiology 1993; 22: 1189-1192.	**Workshop 3**
Class 12 – 28 Feb	• **QUIZ 1**		
Class 13 – 5 Mar	• Practical issues in using secondary data *Pankow*	• Boslaugh S. Secondary Data Sources for Public Health. Chapter 1: **An introduction to secondary data analysis**.	
Class 14 – 7 Mar	• Introduction to project *Widome*	• Review NHIS info on: https://www.cdc.gov/nchs/nhis/index.htm	
Class 15 – 12 Mar	• WORKSHOP 4: Project planning *Pankow/Widome/TAs*		**Workshop 4**
Class 16 – 14 Mar	• Writing an epidemiologic report *Pankow/Widome*	• Szklo M and Nieto FJ. Epidemiology: Beyond the Basics, 3rd ed., Chapter 9: **Communicating results of epidemiologic studies**. • Ryan A & Ellimoottil C. **The Ultimate Guide to Writing Manuscripts**. **https://sph.umich.edu/cehr/pdf/Manuscript_Manual.pdf**	
Class 17 – 26 Mar	• Designing questionnaires and interviews *Guest: Ran Zhou*	• Hulley, Chapter 15: **Designing questionnaires, interviews, and online surveys**.	**Prelim project report**
Class 18 – 28 Mar	• WORKSHOP 5: Survey design & data collection *Pankow/Widome/TAs*		
Class 19 – 2 Apr	• Planning measurements: quality assurance & quality control *Widome*	• Hulley, Chapter 4: **Planning the measurements: precision, accuracy, and validity**. Hulley, Chapter 17: **Implementing the study and quality control**.	

Class 20 – 4 Apr	• WORKSHOP 6 - Sample size estimation *Pankow/Widome/TAs*	• Hulley, Chapter 5: **Getting ready to estimate sample size: hypotheses and underlying principles**. • Hulley, Chapter 6: **Estimating sample size and power: applications and examples.** • Listen to online lecture on sample size (link on Moodle)	**Workshop 5**
Class 21 – 9 Apr	• Screening *Pankow*	• Harris R. **Overview of screening: where we are and where we may be headed**. Epidemiologic Reviews 2011: 33: 1-6.	
Class 22 – 11 Apr	• Building risk prediction models *Pankow*	• Alba AC, et al. **Discrimination and calibration of clinical predication models: User's guides to the medical literature.** JAMA 2017; 318: 1377-1384. • Lin JS, et al. **Nontraditional risk factors in cardiovascular disease risk assessment: Updated evidence report and systematic review for the US Preventive Services Task Force.** JAMA 2018; 320: 281-297.	**Workshop 6**
Class 23 – 16 Apr	• Natural experiments *Widome*	• Craig P, et al. **Using natural experiments to evaluate population health interventions: new Medical Research Council guidance**. J Epidemiol Community Health 2012;66:1182-1186. • Richardson AS et al. **Can the introduction of a full-service supermarket in a food desert improve residents' economic status and health?** Ann Epidemiol Vol 27 (12), 2017.	
Class 24 – 18 Apr	• Surveillance and age/period/cohort effects Pankow/Widome	• Huang X, et al. **Increasing prescription opioid and heroin overdose mortality in the United States, 1999–2014: an age–period–cohort analysis.** Am J Public Health**.** 2018 January; 108(1): 131–136.	**Questions for surveillance panel due: 4/22 at 10am**
Class 25 – 23 Apr	• Panel on surveillance		
Class 26 – 25 Apr	• Communicating epidemiology to the public *Widome*	• Neta G, et al. **Opportunities for epidemiologists in implementation science: a primer**. Am J Epidemiol. 2017 Sep 27 • Mencimer S. **Did drinking give me breast cancer?** Mother Jones, May/June 2018.	**Final project report**
Class 27 – 30 Apr	• Translating epidemiology into policy *Widome*	• Green LW. **Public health asks of systems science: to advance our evidence-based practice, can you help us get more practice-based evidence?** Am J Public Health. 2006 Mar;96(3):406–409.	
Class 28 – 2 May	• Mendelian randomization; course wrap-up *Pankow*	• Haycock PC, et al. **Best (but oft-forgotten) practices: the design, analysis, and interpretation of Mendelian randomization studies.** Am J Clin Nutr 2016; 103: 965-978.	
FINAL QUIZ – 9 May 4:00-6:00pm			

SPH AND UNIVERSITY POLICIES & RESOURCES

The School of Public Health maintains up-to-date information about resources available to students, as well as formal course policies, on our website at www.sph.umn.edu/student-policies/. Students are expected to read and understand all policy information available at this link and are encouraged to make use of the resources available.

The University of Minnesota has official policies, including but not limited to the following:

- Grade definitions
- Scholastic dishonesty
- Makeup work for legitimate absences
- Student conduct code
- Sexual harassment, sexual assault, stalking and relationship violence
- Equity, diversity, equal employment opportunity, and affirmative action
- Disability services
- Academic freedom and responsibility

Resources available for students include:

- Confidential mental health services
- Disability accommodations
- Housing and financial instability resources
- Technology help
- Academic support

EVALUATION & GRADING

Students will be evaluated through a combination of class participation, workshop, and a major project, and two quizzes. There will be no exams. Both A/F and S/N grading options are available. MPH students majoring in epidemiology are required to take the A/F option and achieve a grade of B- or higher to advance in the program.

Class Participation - 15%

Some class participation points (12% total, 2% each) will be based on attendance and participation in six workshops. Under some circumstances, make-ups for class participation may be granted if the student sends an e-mail notification to one of the instructors before the class in which the class participation point is offered to indicate the reason for the anticipated absence. The remaining class participation points (3%) will be awarded if the student submits a written question for the expert panel.

Workshop Assignments – 30%

There will be seven workshop assignments. Each contributes 5% toward the final grade. ****All assignments are due at the beginning of class (4:00pm) one week after the in-class workshop session. (See "Course Outline/Weekly Schedule" for exact due dates.) Groups should submit one set of answers for the group.**** Unless otherwise directed, please upload your assignment to the Moodle site. Late assignments will lose 1% (i.e., 1 point out of 5) per business day (Saturdays, Sundays, and UMN holidays excluded).

Project: Secondary Data Analysis – 30%

The overall objective of Project 2 is to perform secondary data analysis and write a formal research report summarizing the findings. The topic will be predictors or consequences of short sleep duration. We will use data from the National Health Interview Survey (NHIS), a representative survey of U.S. health issues conducted by the National Center for Health Statistics and the Centers for Disease Control and Prevention. Students will need to select a justifiable and public health relevant exposure and/or outcome, select the study population, define the variables, and consider potential confounders. Students will submit a preliminary analysis plan (5% of total grade) and a final project report (25% of total grade).

Quizzes – 25%

There will be two quizzes. Quiz 1 is worth 10% of the final grade; Quiz 2 is worth 15% of the final grade.

Extra Credit: 1-minute papers – up to 2% added to final course grade

Students may earn up to 2% extra credit to the final course grade by participating in optional, occasional 1-minute paper opportunities. At the end of selected lectures, students will be invited to turn in a 1-minute paper where they: 1) name one new concept that was learned that day in lecture, and 2) list one question that they have about that day's lecture. Both parts must be included to count for extra credit. 1-minute papers will only be accepted in class, on lecture day. If a student misses lecture on a 1-minute paper day, the student cannot submit a 1-minute paper. We will answer some of the most useful questions posed, and will distribute the questions and answers to the class via Moodle site. Students who complete all 1-minute paper opportunities will earn 2 extra percentage points added to their final course grade. Students who complete some, but not all 1-minute papers will earn the fraction of 2% that they completed.

Grading Scale
The University uses plus and minus grading on a 4.000 cumulative grade point scale in accordance with the following, and you can expect the grade lines to be drawn as follows:

% In Class	Grade	GPA
93 - 100%	A	4.000
90 - 92%	A-	3.667
87 - 89%	B+	3.333
83 - 86%	B	3.000
80 - 82%	B-	2.667
77 - 79%	C+	2.333
73 - 76%	C	2.000
70 - 72%	C-	1.667
67 - 69%	D+	1.333
63 - 66%	D	1.000
< 62%	F	

- A = achievement that is outstanding relative to the level necessary to meet course requirements.
- B = achievement that is significantly above the level necessary to meet course requirements.
- C = achievement that meets the course requirements in every respect.
- D = achievement that is worthy of credit even though it fails to meet fully the course requirements.
- F = failure because work was either (1) completed but at a level of achievement that is not worthy of credit or (2) was not completed and there was no agreement between the instructor and the student that the student would be awarded an I (Incomplete).
- S = achievement that is satisfactory, which is equivalent to a C- or better
- N = achievement that is not satisfactory and signifies that the work was either 1) completed but at a level that is not worthy of credit, or 2) not completed and there was no agreement between the instructor and student that the student would receive an I (Incomplete).

Evaluation/Grading Policy	Evaluation/Grading Policy Description
Scholastic Dishonesty, Plagiarism, Cheating, etc.	You are expected to do your own academic work and cite sources as necessary. Failing to do so is scholastic dishonesty. Scholastic dishonesty means plagiarizing; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; altering, forging, or misusing a University academic record; or fabricating or falsifying data, research procedures, or data analysis (As defined in the Student Conduct Code). For additional information, please see https://z.umn.edu/dishonesty The Office for Student Conduct and Academic Integrity has compiled a useful list of Frequently Asked Questions pertaining to scholastic dishonesty: https://z.umn.edu/integrity. If you have additional questions, please clarify with your instructor. Your instructor can respond to your specific questions regarding what would constitute scholastic dishonesty in the context of a particular class-e.g., whether collaboration on assignments is permitted, requirements and methods for citing sources, if electronic aids are permitted or prohibited during an exam. Indiana University offers a clear description of plagiarism and an online quiz to check your understanding (http://z.umn.edu/iuplagiarism).
Late Assignments	Late assignments will lose 1% (i.e., 1 point out of 5) per business day (Saturdays, Sundays, and UMN holidays excluded).
Attendance Requirements	As described in the "Evaluation and Grading" section (see above for more detail), some class participation points (12% total) will be based on attendance and participation in the seven workshop sessions.
Extra Credit	Please see the "Extra Credit" subsection in the "Evaluation and Grading" section. This is the only opportunity for extra credit in this course.