



Syllabus
 SPHG 712: Methods & Measures for Public Health Practice
 2 Credits | Online

Table of Contents

Course Overview 2

- Course Description2
- Corequisites2
- Office Hours2
- Course Texts2
- Course Format3

Course Assignments and Assessments 3

- Grading3

Course Policies 5

- Recognizing, Valuing, and Encouraging Inclusion and Diversity in the Classroom.....5
- Accessibility6
- Counseling and Psychological Services6
- Time Commitment.....6
- UNC Honor Code6
- Instructor Expectations7
- Student Expectations7
- Teams and Teamwork8

Competencies, Learning Objectives, and Assessment10

- Assignment Descriptions and Rubrics12

 - Case Studies12
 - Reflections12
 - Quizzes12
 - Exams12
 - Participation.....13
 - Team Peer Evaluation13
 - Team Article Critique13

Course at a Glance.....14

Course Schedule17

Appendix: Rubrics.....29

- Journal Article Critique Rubric.....29
- Case Studies.....30
- Reflections32
- Team Peer Evaluation32
- Team Project.....33

Course Overview

Course Description

The Methods and Measures course is one of three two-credit courses students take in the first semester of their first year in the MPH program. This course introduces epidemiologic concepts and how to quantitatively describe population patterns of health, inequities, and their determinants.

Students will focus on what to measure, how to measure it, whom to measure it in, and how to do so in ways that minimize bias. These concepts and skills are used to critically review the public health evidence base. Assignments in the course are designed for collaborative, active, and authentic learning. Case study team discussions, reflections, and data analysis activities will promote critical thinking and evidence-based reasoning.

We frame MPH core concept integration as students applying concepts from multiple courses to public health practice-related tasks. In the first semester of the MPH Core training, an overarching public health practice-related task is a comprehensive white paper describing a public health problem.

Multiple assignments in the Methods and Measures course will provide students opportunities to learn concepts and skills they will apply to their comprehensive white paper. Students will be supported to correctly apply epidemiologic concepts to their description of a public health problem. We will also provide opportunities for students to connect concepts and topics across the two or three first-semester core courses.

Corequisites

SPHG 713: Understanding Public Health Issues

Office Hours

Office hours for the residential version of the course will be posted the first week of class. Online section office hours will be posted by section lead instructors. Students may request a virtual appointment by email. Virtual office hours may be conducted via phone, Skype, or Zoom.

Course Texts

In this course, we will use course handouts, journal articles, and several ERIC Notebooks (epidemiology methods periodical—free for students),. We will use the following textbook to provide additional context and examples: Aschengrau, A., & Seage, G. R. (2013). *Essentials of epidemiology in public health* (3rd or 4th ed.). Sudbury, MA: Jones and Bartlett Publishers.

Readings will be noted in the course schedule. When lectures and textbook have discrepancies, refer to the lecture. The UNC Course Reserves serves as a repository of the journal articles. The majority of students will need to register for Course Reserves the first time they access it. To register with Course Reserves for this course residential students click on the “Course Reserves” button in the left-hand navigation of Sakai. You only need to do this once. Online students will have a different procedure.

Course Format

This course uses a flipped-classroom model. Live sessions for online students or class sessions for residential students will be used to work in teams to apply course material to specific public health topics through case study activities and discussion. Students will have opportunities to interact with the instructor and ask questions. In order to effectively participate in live and class sessions, students are expected to complete weekly readings, online lectures, and preparatory assignments in advance of each session.

Course Assignments and Assessments

This course will include graded assignments and exams.

Component	Individual	Team	Percentage (%)
Case Studies (11)			
Case Study Preparation	X		10
Team Case Questions		X	20
Reflections (4)	X		5
Quizzes (3)	X		5
Exam 1: Measures of Occurrence and Association Data Analysis	X		10
Exam 2: Systematic Error Data Analysis	X		10
Final Exam: Journal Article Critiques	X		15
Participation (random live session polls and engagement with section instructor and team mates in live session)	X		2.5
Live session attendance (13 weeks)			2.5
Team Peer Evaluations (3)		X	1.66
		X	1.67
		X	1.67
Team Project Article Critique		X	15
TOTAL	60	40	100

Grading

Final course grades will be determined using the following scale, consistent with [UNC Graduate School grading policies](#).

H	Greater than or equal to 93	High Pass: Clear excellence
P	Greater than or equal to 80	Pass: Entirely satisfactory graduate work
L	Greater than or equal to 70	Low Pass: Inadequate graduate work

F	Less than 70	Fail
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Note: We do not round up your final average grade (so, for example, a grade of 92.96 is a P).

Course Policies

Recognizing, Valuing, and Encouraging Inclusion and Diversity in the Classroom

We share the School's [commitment to diversity](#). We are committed to ensuring that the School is a diverse, inclusive, civil, and welcoming community. Diversity and inclusion are central to our mission—to improve public health, promote individual well-being, and eliminate health inequities across North Carolina and around the world. Diversity and inclusion are assets that contribute to our strength, excellence, and individual and institutional success. We welcome, value and learn from individual differences and perspectives. These include but are not limited to: cultural and racial/ethnic background; country of origin; gender; age; socioeconomic status; physical and learning abilities; physical appearance; religion; political perspective; sexual identity; and veteran status. Diversity, inclusiveness, and civility are core values we hold, as well as characteristics of the School that we intend to strengthen.

We are committed to expanding diversity and inclusiveness across the School—among faculty, staff, students, on advisory groups, and in our curricula, leadership, policies, and practices. We measure diversity and inclusion not only in numbers but also by the extent to which students, alumni, faculty, and staff members perceive the School's environment as welcoming, valuing all individuals, and supporting their development. In this class, we practice these commitments in the following ways:

- Develop participation approaches that acknowledge the diversity of ways of contributing in the classroom and foster participation and engagement of *all* students.
- Structure assessment approaches that acknowledge different methods for acquiring knowledge and demonstrating proficiency.
- Encourage and solicit feedback from students to continually improve inclusive practices.

As a student in the class, you are also expected to understand and uphold the following UNC policies:

- **Diversity and Inclusion at the Gillings School of Global Public Health:**
<http://sph.unc.edu/resource-pages/diversity/>
- **UNC Non-Discrimination Policies:**
<https://eoc.unc.edu/our-policies/policy-statement-on-non-discrimination/>
- **Prohibited Discrimination, Harassment, and Related Misconduct at UNC:**
<https://deanofstudents.unc.edu/incident-reporting/prohibited-harassmentsexual-misconduct>

Accessibility

UNC-CH supports all reasonable accommodations, including resources and services, for students with disabilities, chronic medical conditions, a temporary disability, or a pregnancy complication resulting in difficulties with accessing learning opportunities.

All accommodations are coordinated through the UNC Office of Accessibility Resources & Services (ARS), <https://ars.unc.edu/>; phone 919-962-8300; email ars@unc.edu. Students must document/register their need for accommodations with ARS before accommodations can be implemented.

Counseling and Psychological Services

CAPS is strongly committed to addressing the mental health needs of a diverse student body through timely access to consultation and connection to clinically appropriate services, whether for short or long-term needs. Go to their website: <https://caps.unc.edu> or visit their facilities on the third floor of the Campus Health Services building for a walk-in evaluation to learn more.

Time Commitment

A two-hour graduate course is expected to require about two hours of contact time, with approx six hours of outside preparation time. While these may vary from week-to-week and student-to-student, the time commitment for this, and any rigorous course, is significant.

UNC Honor Code

As a student at UNC-Chapel Hill, you are bound by the university's [Honor Code](#), through which UNC maintains standards of academic excellence and community values. It is your responsibility to learn about and abide by the code. All written assignments or presentations (including team projects) should be completed in a manner that demonstrates academic integrity and excellence. Work should be completed in your own words, but your ideas should be supported with well-cited evidence and theory. To ensure effective functioning of the [Honor System](#) at UNC, students are expected to

- a. Conduct all academic work within the letter and spirit of the Honor Code, which prohibits the giving or receiving of unauthorized aid in all academic processes.
- b. Learn the recognized techniques of proper attribution of sources used in written work and to identify allowable resource materials or aids to be used during completion of any graded work.
- c. **Certify that no unauthorized assistance has been received or given in the completion of graded work.**
- d. Report any instance in which reasonable grounds exist to believe that a fellow student has violated the Honor Code.

Instructors are required to report suspected violations of the Honor Code, including inappropriate collaborative work or problematic use of secondary materials, to the Honor Court. Honor Court sanctions can include receiving a zero for the assignment, failing the course, and/or suspension from the university. If you have any questions about [your rights and responsibilities](#), please consult the Office of Student Conduct at <https://studentconduct.unc.edu/>, or consult these other resources:

- Honor system [module](#)
- UNC library's [plagiarism tutorial](#)
- UNC Writing Center [handout on plagiarism](#)

Specific to this course: Course exams must be completed without the assistance of any other person. Students must not consult any other person (taking this course or not taking this course, other than the instructor) about any test material. Students must not consult tests from previous semesters. Any suspicion of violation of the Honor Code is serious and will be taken to the Honor Court.

Case study assignments can be discussed among classmates, the Academic EnrichmentTutors, or others, but the case study preparations should be completed by each student individually. Copying answers, without independent verification, will be considered a violation of the UNC honor code.

Honor Court sanctions for academic misconduct can include receiving a zero for the assignment, failing the course and/or suspension from the University.

Instructor Expectations

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| Email | The instructor will typically respond to email within 24–48 hours. If you email on the weekend, or receive an out-of-office reply when emailing, it may take longer to receive a reply. The instructor will provide advance notice, if possible, when their responses will be limited. |
| Feedback | Graded assignments will receive feedback in alignment with the assessment rubrics. |
| Grading | Assignments will be graded no more than two weeks after the due date. Assignments that build on the next assignment will be graded within one week of the final due date. Early submissions will not be graded before the final due date. |

Student Expectations

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| Appropriate Use of Course Resources | The materials used in this class, including but not limited to the syllabus, exams, quizzes, and assignments, are copyright-protected works. Any unauthorized copying of the class materials is a violation of federal law and may result in disciplinary actions being taken against the student. Additionally, the sharing of |
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class materials without the specific, express approval of the instructor may be a violation of the University's Student Honor Code and an act of academic dishonesty, which could result in further disciplinary action. This includes, among other things, uploading class materials to external websites for the purpose of sharing those materials with other current or future students.

Online/Asynchronous Material

In advance of weekly in-class or live sessions, students are expected to complete readings, listen to recorded lectures, and complete case study questions provided on the course website. Class or live session preparedness will be assessed as part of your grade.

Teams and Teamwork

This course incorporates collaborative learning by design. Not only do you learn the course material, you learn to work with colleagues who have different backgrounds, life experience, and work styles-valuable skills for the work place.

Students will be assigned to teams by the end of the first full week of class; these teams will be posted to the course website. Teams will each have approximately five members, with a mixture of students from diverse backgrounds.

Attendance/ Participation in Class Live Sessions

Your attendance in class or live session is an integral part of your learning experience in this course. If you anticipate being unavoidably absent, please notify the course instructor. Attendance and contributions to the class live session learning environment will be assessed as part of your grade.

Assignments

Submit all assignments through the course website (learning management system, LMS). Specific details about how to use the online course LMS is available in COMPASS. Emailing assignments is not acceptable unless prior arrangements have been made. If you are having trouble submitting assignments, try a different web browser first. If switching browsers does not work, email the instructor for guidance. For formatting of assignments, use Calibri/Calibri Light, font size 12. For assignment name formatting, we will use the following convention:

Course #, first name, last name, assignment name

Course #, Team #, assignment name

Please submit your assignments as word documents.

Late Work

Late submissions for exams, quizzes, reflections, team case studies, team projects will receive a 10% point reduction for every day that they are late. After 7 days, late submissions will receive zero points. One exception to this policy is case study preparation assignments. Late case study preparation will receive a zero. You should inform the instructor during the first week of class or as soon as possible during the semester if you anticipate not being able to attend an exam or presentation due to extenuating circumstances, such as a medical procedures or major illness. Should a medical or family emergency that impacts submission of work arise during the course, inform the instructor as soon as possible.

Communication

You are expected to follow common courtesy in all communication to include email, team discussions, and face to face /live sessions. All electronic

communications sent should follow proper English grammar rules and include complete sentences.

All email correspondence between student/instructor and peer/peer will be conducted in a professional manner following email etiquette.

View the following link for more information on email etiquette:

<http://metropolitanorganizing.com/etiquette-professional-organizing-services/essential-email-etiquette-tips/>

Technical Support

Residential: The UNC Information Technology Services (ITS) department provides technical support 24 hours per day, seven days per week. If you need computer help, please contact the ITS Help Desk by phone at +1-919-962-HELP (919-962-4357).

Online: If you have technical questions or concerns you can contact the support team for assistance. Students please call 855-770-2159 or email studentsupport@onlinemph.unc.edu. Faculty please call 877-552-0628 or email facultysupport@2u.com.

Academic Enrichment Program (Tutoring)

The SPH Academic Enrichment Program is available to provide *supplementary tutoring* – particularly in the quantitative disciplines. More information can be found here: <http://sph.unc.edu/students/student-resources/>

Computing Expectations

In Methods and Measures, we will use statistical software as a tool to help you understand how course concepts, such as how you compute a risk, are connected with “real live” data analysis (it’s exciting!) The focus of the course is not on the statistical software itself.

Students will learn to conduct basic data analyses (descriptive statistics; measures of occurrence, association, and uncertainty; confounding adjustment) using computer-based software.

If the student already knows a specific statistical software (SAS, R, SPSS, etc.) the student can use that or any software. We will be referencing and providing resources for **Stata** software, however any software can be used for the case studies, quizzes, and tests.

Students will be provided instructions on key data commands. Note the learning the computing software is ‘front loaded.’ Students who are learning a new software may need to invest several hours in the second and third week of class – just on the software. It’s a useful investment of student time.

Stata was selected as the statistical program, in part, because the learning curve is ‘moderate’ but not excessive. While students should anticipate there IS a learning curve to the software, it should not consume the course.

Competencies, Learning Objectives, and Assessment

MPH students in accredited schools are required to demonstrate specific foundational public health [competencies](#) and knowledge.

In this course, you will develop the following foundational competencies:

MPH01. Apply epidemiological methods to the breadth of settings and situations in public health practice.

MPH02. Select **quantitative** and qualitative data collection methods appropriate for a given public health context.

MPH04. Interpret results of data analysis for public health research, policy, or practice.

This course will also cover the following foundational knowledge:

FLO04. List major causes and trends of morbidity and mortality in the United States or other community relevant to the school or program.

FLO06. Explain the critical importance of evidence in advancing public health knowledge.

The table below maps CEPH Foundational competencies to course learning objectives and assessments.

Competencies	Learning Objectives	Assessment Assignments with brief descriptions
MPH01. Apply epidemiological methods to the breadth of settings and situations in public health practice	<ul style="list-style-type: none"> Calculate and interpret measures of occurrence, association, and uncertainty to characterize a public health issue Explain the effects of random and systematic error in epidemiologic studies 	<p>Exam 1: Students will calculate and interpret measures of occurrence, association, and uncertainty using an instructional data set and statistical program.</p> <p>Exam 2: Students will evaluate potential confounding using an instructional data set and statistical program.</p> <p>Quiz 2. Students will identify and describe the effects of selection bias, misclassification, and confounding</p>
MPH02. Select quantitative and qualitative data collection methods appropriate for	<ul style="list-style-type: none"> Indicate which study designs and measures are most suitable for specific situations 	<p>Quiz 3. Students will identify different study design types and measures in the published literature and explain why the design was chosen.</p> <p>Individual and team week case study in which students discuss optimal study designs to investigate vaccines and autism</p>

<p>a given public health context</p>		<p>Team Article Critiques Students will critique the selection of quantitative data chosen to describe a public health problem.</p> <p>Final Exam. Students will apply course concepts to critique the selection of quantitative data chosen to describe a public health problem.</p>
<p>MPH04. Interpret results of data analysis for public health research, policy or practice</p>	<ul style="list-style-type: none"> • Integrate knowledge and skills to critically review evidence based epidemiologic literature 	<p>Quiz 1. Students will practice interpreting measures of occurrence, association, and uncertainty from different public health issues</p> <p>Team Article Critique. Applying their knowledge of study designs and systematic error, teams will interpret and critique an epidemiologic article.</p> <p>Final Exam. Students will apply course concepts to critique peer reviewed public health evidence based literature.</p>

Assignment Descriptions and Rubrics

Case Studies

Case Study Preparation. Students will individually complete case study-related questions before class each week. Each case preparation will be graded based on attempt and completion. We would like you to complete all the questions with a good faith effort, without help from other students. We will grade for critical thinking and effort: making a thoughtful and thorough attempt at answering a question will get full points, even if your answer is not entirely correct. Student submissions will be graded based on a standardized grading rubric. Late submissions will receive a zero.

Team Case Study Questions. Team case studies are an important part of course learning. Students will be work collaboratively with their teammates to answer the team case study questions. Given the course emphasis on collaborative learning, we expect each team member to contribute meaningfully to the discussion and that team members hold each other accountable. We recommend student teams create a group document in share software (Google docs or other), in which they can easily synthesize and summarize team member input, and then submit the team Word document on the course website.

Reflections

We value students connecting and integrating concepts across the first semester core courses (Methods and Measures SPHG 712, Understanding Public Health Issues SPHG 713, and for some students, Analysis SPHG 711.) Students will write two paragraphs at four different times during the semester. We would like students to actively explore and engage in making connections across methods, concepts, and topics. For example, students might discuss similarities and differences in the discussion of “risk” or how to apply Methods and Measures, Understanding Public Health Issues, and Analysis course concepts to an investigation of lead in water and effects on cognitive function in children.

As another example, you could talk about key public health terms and how they are used similarly (or differently!) across classes. You could discuss the opioid epidemic in the context of risk vs. risk factors/determinants/causes. You could also take a disease or exposure and discuss how you can use concepts from two of the courses to identify, investigate, and subsequently reduce the incidence or prevalence (now that you know the difference between the two!). Note, these connections can be across any two of the core courses. Make sure you specify which two to three courses you discuss. Finally, what should this assignment look like? There is no specific document that you need to start from. Open up a Word document and write at least two paragraphs.

Quizzes

To help students prepare for the exams, students will check their understanding of basic concepts of occurrence, comparisons, study designs, and systematic error with three short multiple-choice quizzes.

Exams

Students will have three exams throughout the semester. The first two exams focus on data analysis and interpretation. Students will use the statistical program Stata to analyze an instructional dataset. For the final exam, students will integrate their course concepts by critically reviewing specific aspects of public health evidence based journal articles.

Participation

Students are expected to participate in weekly live sessions and contribute to the full-class and team breakout sessions. Participation will be assessed through weekly live session attendance, random in class polls (66%), and section instructor assessment (34%).

Team Peer Evaluation

Students will complete three peer evaluations for their team members during the semester. A link will be posted where students will record their evaluations. Evaluation aspects include actively participating, accomplishing tasks on time, work reflecting acceptable level of effort, supporting the efforts of fellow group members, excelling at facilitating team discussions.

Team Article Critique

In this assignment, student teams will be given a peer reviewed journal article; the team will then critique with same rubric used for the final exam. This team project assignment will give students the opportunity to apply concepts and skills needed for their SPHG 713 *Understanding Public Health Issues* final white paper.

Course at a Glance

Weeks*	Date	Course Topic	Live Sessions	Assignment Due*
<i>Unit 1: Introductions, Measures of Occurrence, and Comparison</i>				
0		Course Introduction	Welcome Integrated Core and Course Overview Population Perspective	
1		Measures of Occurrence Part 1	Case Study Part 1 Preparation Review Risk Calculations and Interpretations Team Charter & Team Case 1 Part 1 Discussion Questions Brief Introduction to UNC Virtual Lab & Stata	Case Study 1 Preparation Team Case Study 1
2		Measures of Disease Occurrence Part 2	Case Study 2 Preparation Review Rate Calculations Population Sampling Team Case Study 2 Questions Discussion	Case Study 2 Preparation Team Case Study 2 Reflection 1
3		Measures of Associations. Comparisons	Case Study 3 Preparation Review Team Case Study 3 Questions Discussion Exam Review	Case Study Preparation 3 Team Case Study 3 Quiz 1
<i>Unit 2: Study Designs</i>				
4		Causal Thinking. Study Design Overview. Cohorts, RCTs	Case Study Preparation 4 Review Team Case Study 4 Questions Discussion	Case Study Preparation 4 Team Case Study 4 Exam 1 Measures of Occurrence Association, Uncertainty

5		Study Designs. Cross-sectional. Ecologic. Case Series	Case Study Preparation 5 Review. Firearm Laws and Gun Mortality Case Study Reflection Discussion Team Case Study 5 Questions Discussion	Case Study Preparation 5 Team Peer Evaluation 1 Team Case Study 5
6		Study Designs. Case Control. Integration	Case Study Preparation 6 Review Vaccines and Autism Case Study, Integration Team Case Study 6 Questions Discussion	Case Study Preparation 6 Team Case Study 6
Unit 3: Random and Systematic Error				
7		Systematic and Random Error Overview. Selection Bias	Case Study Preparation 7 Review Reflection Discussion Team Case Study 7 Questions Discussion	Case Study Preparation 7 Reflection 2 Team Case Study 7
8		Systematic Error. Information Bias	Case Study Preparation 8 Review Team Case Study 8 Questions Discussion	Case Study Preparation 8 Team Case Study 8
9		Systematic Error. Confounding Part 1	Case Study Preparation 9 Review Team Case Study 9 Questions Discussion	Case Study Preparation 9 Team Case Study 9 Quiz 2: Study Design and Systematic Error
10		Systematic Error. Confounding Part 2	Case Study Preparation 10 Review Team Case Study 10 Questions Discussion Exam Review	Case Study Preparation 10 Team Peer Evaluation 2 Team Case Study 10
Unit 4: Concept Integration				
11		Critiquing Public Health Evidence. Part 1	Case Study Preparation 11 Review	Case Study Preparation 11

			<p>Team Case Study 11 Questions Discussion (Journal Article Review)</p> <p>Reflection Discussion</p> <p>Team Project Journal Article given to teams</p>	<p>Reflection 3</p> <p>Team Case Study 11</p> <p>Exam 2: Systematic Error</p>
12		Causal Thinking. Bradford Hill Guidelines	Team Project Work & Consults with Instructor	Quiz 3 Article Critique
13		Critiquing Public Health Evidence. Part 2. Course Wrap-Up and Debriefing	<p>Team Course Evaluation**</p> <p>Course Review & Wrap-Up</p>	<p>Team Article Critique</p> <p>Final Exam: Journal Article Critique</p> <p>Team Peer Evaluation 3</p> <p>Reflection 4</p>

Readings are listed on the course website, in each weekly folder.

*Case Study Preparation answers, quizzes, team peer evaluations, Team Journal Article Critique, and exams are due 24 hours before the live session for that week. Exams will be completed in a 4 day time window (time of your own choosing during this week).

Team Case Study answers, reflections are due 78 hours after the live session for that week, unless otherwise specified.

**Student teams will work together on a course evaluation submitted by end of live session.

Course Schedule

The instructor reserves the right to make changes to the syllabus, including project due dates and test dates. These changes will be announced as early as possible.

UNIT 1. Measures of Occurrence and Comparison

Week/Topic	0. Course Introduction
Competency or Foundational Knowledge	MC01. Apply epidemiological methods to the breadth of settings and situations in public health practice.
Learning Objectives	<ul style="list-style-type: none"> Describe the design and structure of the integrated MPH core courses, both fall and spring. Reflect upon the population focus of public health.
Required Readings	<ul style="list-style-type: none"> Rose, G. (1985). Sick individuals and sick populations. <i>International Journal of Epidemiology</i>, 14(1), 32–38. (In COMPASS)
Asynchronous Lectures	<ul style="list-style-type: none"> Course Overview, Methods and Measures for Public Health Practice
Assignments	Review course syllabus, course structure, UNC Virtual Lab, computer requirements, reserve readings.

Week/Topic	1. Measures of Occurrence, Part 1
Competency or Foundational Knowledge	<p>MC01. Apply epidemiological methods to the breadth of settings and situations in public health practice.</p> <p>MC04. Interpret results of data analysis for public health research, policy, or practice.</p>
Learning Objectives	<ul style="list-style-type: none"> Recognize key historical events in the development of the epidemiology as a field. Distinguish population risk factors vs. individual risk factors. Distinguish between prevalent and incident cases. Describe open and closed populations. Calculate and interpret prevalence, risks, rates, odds, and counts. Identify the top five causes of mortality globally.
Required Readings	<ul style="list-style-type: none"> ERIC Notebook: “Risk and Rate Measures in Cohort Studies.” Aschengrau, skim Chapter 2, pp. 33–54. Course handout-Spreadsheet on Measures of Disease Occurrence Heron M. Deaths: Leading causes for 2016. National Vital Statistics Reports; vol 67 no 6. Hyattsville, MD: National Center for Health Statistics. 2018 (abstract, table 1) Kemal S, Sheehan K, Feinglass J. Gun carrying among freshmen and sophomores in Chicago, New York City and Los Angeles public schools:

	<p>the Youth Risk Behavior Survey, 2007-2013. <i>Inj Epidemiol.</i> 2018 Apr 10;5(Suppl 1):12</p> <ul style="list-style-type: none"> • Kramer MR, Black NC, Matthews SA, James SA. The legacy of slavery and contemporary declines in heart disease mortality in the U.S. South. <i>SSM Popul Health.</i> 2017 Dec;3:609-617. doi: 10.1016/j.ssmph.2017.07.004.
Asynchronous Lectures	<ul style="list-style-type: none"> • Definition of Epidemiology and Historical Background • Overview of Measures of Occurrence • Types of Populations • Incident vs. Prevalent Cases • Prevalence • Risk • Odds • Counts and Top Causes of Mortality Application • Practice Problems
Live Session	Check-In, Review, Team Case Study Breakouts, Report Out, Wrap-Up
Assignments/Deadlines	<ul style="list-style-type: none"> • Case Study Preparation 1 • Team Case Study 1

Week/Topic	2. Measures of Occurrence, Part 2
Competency or Foundational Knowledge	<p>MC01. Apply epidemiological methods to the breadth of settings and situations in public health practice.</p> <p>MC04. Interpret results of data analysis for public health research, policy, or practice.</p>
Learning Objectives	<ul style="list-style-type: none"> • Define and calculate person time. • Calculate and interpret (true) rates. • Describe how rates are approximated. • Distinguish between a sample and population. • Describe how generalizability is related to sampling. • Calculate measures of occurrence using statistical software.
Required Readings	<ul style="list-style-type: none"> • ERIC Notebook "Calculating Person-Time" • Ranapurwala SI, Shanahan ME, Alexandridis AA, Proescholdbell SK, Naumann RB, Edwards D Jr, Marshall SW. Opioid Overdose Mortality Among Former North Carolina Inmates: 2000-2015. <i>Am J Public Health.</i> 2018 Sep;108(9):1207-1213 (Abstract, Table 1, Figure 1) • Fowler KA, Dahlberg LL, Haileyesus T, et al. Childhood Firearm Injuries in the United States. <i>Pediatrics.</i> 2017;140(1):e20163486 (Figure 1)
Asynchronous Lectures	<ul style="list-style-type: none"> • Measures of Occurrence, Part 2 • Rates, Person Time • Rates, Part 2 • Practice Problems • Populations and Sampling • Measures of Occurrence Data Analysis

Live Session	Check-In, Review, Team Case Study Breakouts, Report Out, Wrap-Up
Assignments/Deadlines	<ul style="list-style-type: none"> • Case Study Preparation 2. • Team Case Study 2 • Reflection 1
Week/Topic	3. Measures of Comparison/Association
Competency or Foundational Knowledge	<p>MC01. Apply epidemiological methods to the breadth of settings and situations in public health practice.</p> <p>MC04. Interpret results of data analysis for public health research, policy, or practice.</p>
Learning Objectives	<ul style="list-style-type: none"> • Calculate and interpret ratio and difference measures. • Distinguish strengths and limitations of ratio measures compared with difference measures. • Construct a contingency table to calculate measures of association. • Calculate and interpret measures of uncertainty.
Required Readings	<ul style="list-style-type: none"> • ERIC Notebooks: “CommonMeasureStatsEpiLit,” “Common Statistical Tests and Applications in Epidemiological Literature.” • Aschengrau, skim Chapter 3, pp. 59–70. • Course handout. • Ranapurwala SI, Shanahan ME, Alexandridis AA, Proescholdbell SK, Naumann RB, Edwards D Jr, Marshall SW. Opioid Overdose Mortality Among Former North Carolina Inmates: 2000-2015. <i>Am J Public Health</i>. 2018 Sep;108(9):1207-1213. (Table 2) • Simckes MS, Simonetti JA, Moreno MA, Rivara FP, Oudekerk BA, Rowhani-Rahbar A. Access to a Loaded Gun Without Adult Permission and School-Based Bullying. <i>J Adolesc Health</i>. 2017 Sep;61(3):329-334. (Table 3) • Pool LR, Carnethon MR, Goff DC Jr, Gordon-Larsen P, Robinson WR, Kershaw KN. Longitudinal Associations of Neighborhood-level Racial Residential Segregation with Obesity Among Blacks. <i>Epidemiology</i>. 2018 Mar;29(2):207-214 (Table 3)
Asynchronous Lectures	<ul style="list-style-type: none"> • Introduction to Measures of Association/Comparison • 2-by-2 Tables • Risk Ratio and Differences Calculations • Risk Ratio and Difference Interpretations • Rate Ratio and Difference Calculations • Rate Ratio and Difference Interpretations • Odds Ratio • Reasons for Ratio and Difference Measures • Measures of Uncertainty (95% Confidence Intervals) • Measures of Comparison Data Analysis
Live Session	Check-In, Review, Team Case Study Breakouts, Report Out, Wrap-Up

Assignments/Deadlines	<ul style="list-style-type: none"> • Case Study Preparation 3 • Team Case Study 3 • Quiz 1
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UNIT 2: Causal Thinking and Study Designs

Week/Topic	4. Causal Thinking, Study Designs Overview, Cohorts, RCTs
Competency or Foundational Knowledge	<p>MC01. Apply epidemiological methods to the breadth of settings and situations in public health practice.</p> <p>MC02. Select quantitative and qualitative data-collection methods appropriate for a given public health context.</p> <p>MC04. Interpret results of data analysis for public health research, policy, or practice.</p>
Learning Objectives	<ul style="list-style-type: none"> • Describe how different study designs contribute to the evidence base. • Explain the difference between experimental and observational studies. • Distinguish cohort and RCT study designs. • Identify the advantages and disadvantages of cohorts and randomized control trials. • Describe the purpose of randomization and key RCT terms.
Required Readings	<ul style="list-style-type: none"> • Eric Notebooks: “Randomized Control Trials,” “Cohort Studies.” • Aschengrau, skim Chapter 6, Overview, pp. 143–167; Chapter 7, RCTs, pp. 173–189; Chapter 8, Cohort, pp. 205–229. • Course handout-Study Design Spreadsheet • Franks PW, Hanson RL, Knowler WC et al. Childhood Obesity, Other Cardiovascular Risk Factors, and Premature Death. <i>NEJM</i>. 2010;362(6):485-93. Skim/Abstract <ul style="list-style-type: none"> ○ Gregg EW. Editorial: Are Children the Future of Type 2 Diabetes Prevention? <i>NEJM</i>. 2010;362(6):548-50. (skim) ○ Letters to the Editor Re: Franks PW, Hanson RL, Knowler WC et al. Childhood Obesity, Other Cardiovascular Risk Factors, and Premature Death. <i>NEJM</i>. 2010;362(19):1841-2. (skim) ○ Rwashwana et al. (2016). Advancing the application of systems thinking in health: understanding the dynamics of neonatal mortality in Uganda. <i>Health Research Policy and Systems</i>. (read Abstract) ○ Fink, D. S., Keyes, K. M., & Cerdá, M. (2016). Social determinants of population health: A systems sciences approach. <i>Current Epidemiology Reports</i>, 3(1), 98–105. Epub 2016 Feb 2. (read Abstract)
Asynchronous Lectures	<ul style="list-style-type: none"> • Causal Thinking and Systems Thinking • Study Design Overview • Cohort Basics • Cohort Measures of Occurrence and Association

	<ul style="list-style-type: none"> • Randomized Control Trials (RCTs) • Interventions
Live Session	Check-In, Review, Team Case Study Breakouts, Report Out, Wrap-Up
Assignments/Deadlines	<ul style="list-style-type: none"> • Case Study Preparation 4 answers. • Team Case Study 4 answers • Exam 1, Measures of Occurrence, Association

Week/Topic	5. Cross-sectional and Ecologic Study Designs
Competency or Foundational Knowledge	<p>MC01. Apply epidemiological methods to the breadth of settings and situations in public health practice.</p> <p>MC02. Select quantitative and qualitative data-collection methods appropriate for a given public health context.</p> <p>MC04. Interpret results of data analysis for public health research, policy, or practice.</p>
Learning Objectives	<ul style="list-style-type: none"> • Compare advantages and disadvantages of cross-sectional and ecologic studies. • Define the “ecologic fallacy.” • Distinguish studies that have individual and/or ecologic characteristics. • Identify the “unit of analysis” in a public health–related publication.
Required Readings	<ul style="list-style-type: none"> • ERIC Notebooks: “Cross-Sectional Studies,” “Ecologic Studies.” • Crifasi CK, Merrill-Francis M, McCourt A, Vernick JS, Wintemute GJ, Webster DW. Association between Firearm Laws and Homicide in Urban Counties. <i>J Urban Health</i>. 2018 Jun;95(3):383-390. doi: 10.1007/s11524-018-0273-3 • Bor J, et al. Police killings and their spillover effects on the mental health of black Americans: a population-based quasi-experimental study. <i>Lancet</i> 2018. 392: 302-310. • Aschengrau, skim Chapter 6, pp. 161–164; Ecologic, pp. 164–165.
Asynchronous Lectures	<ul style="list-style-type: none"> • Cross-Sectional Study Basics • Ecologic Studies • Ecologic Fallacy • Ecologic Study Examples • Practice Identifying Study Designs When Reading the Literature • Case Series/Case Reports • Study Design Practice
Live Session	Check-In, Review, Team Case Study Breakouts, Report Out, Wrap-Up
Assignments/Deadlines	<ul style="list-style-type: none"> • Case Study Preparation 5 • Team Case Study 5 • Reflection 2 • Team Peer Evaluation 1

Week/Topic	6. Case Control and Study Design Integration
Competency or Foundational Knowledge	<p>MC01. Apply epidemiological methods to the breadth of settings and situations in public health practice.</p> <p>MC02. Select quantitative and qualitative data-collection methods appropriate for a given public health context.</p> <p>MC04. Interpret results of data analysis for public health research, policy, or practice.</p>
Learning Objectives	<ul style="list-style-type: none"> • Compare the advantages and disadvantages of case-control studies, cohort, ecologic, and cross-sectional studies. • Explain the relation of controls in a case-control study to the study base (source population) for the cases. • Distinguish between hospital-based and population-based controls in a case control study, and identify their advantages. • Explain why matching is used in case-control studies. • Describe how to chose a study design.
Required Readings	<ul style="list-style-type: none"> • Aschengrau, skim Chapter 9, pp. 233–259. • ERIC Notebook: “Case-Control Studies.” • Uno Y, Uchiyama T, Kurosawa M, Aleksic B, Ozaki N. The combined measles, mumps and rubella vaccine and the total number of vaccines are not associated with development of autism spectrum disorder: The first case control study in Asia Vaccine. 2012 Jun 13;30(28):4292-8. doi: 10.1016/j.vaccine.2012.01.093. Epub 2012 Apr 20. • Wakefield AJ1, Murch SH, Anthony A, Linnell J, Casson DM, Malik M, Berelowitz M, Dhillon AP, Thomson MA, Harvey P, Valentine A, Davies SE, Walker-Smith JA. Ileal-lymphoid-nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children. Lancet. 1998 Feb 28;351(9103):637-41.
Asynchronous Lectures	<ul style="list-style-type: none"> • Study Designs: Case Control Overview • Case Control Measures of Association • Key Steps in a Case Control Study • Matching • Integrating Study Designs and Measures of Association • Applying Epidemiologic Study Design Concepts to Topics of Health Equity, Intersectionality, Racism • Examples of Health Disparities Research
Live Session	Check-In, Review, Team Case Study Breakouts, Report Out, Wrap-Up
Assignments/Deadlines	<ul style="list-style-type: none"> • Case Study Preparation 6 • Team Case Study 6

UNIT 3: Random and Systematic Error

Week/Topic	7. Systematic and Random Error Overview, Internal External Validity, and Selection Bias
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Competency or Foundational Knowledge	<p>MC01. Apply epidemiological methods to the breadth of settings and situations in public health practice.</p> <p>MC02. Select quantitative and qualitative data-collection methods appropriate for a given public health context.</p> <p>MC04. Interpret results of data analysis for public health research, policy, or practice.</p>
Learning Objectives	<ul style="list-style-type: none"> • Distinguish random error from systematic error. • Differentiate between internal and external validity. • Explain selection bias. • Describe how selection bias can be reduced or eliminated from epidemiological studies.
Required Readings	<ul style="list-style-type: none"> • Aschengrau, skim Chapter 10, Overview, pp. 265–289; Selection Bias, pp. 269–275. • Vetter C, Devore EE, Wegrzyn LR, Massa J, Speizer FE, Kawachi I, Rosner B, Stampfer MJ, Schernhammer ES. Association between rotating night shift work and risk of coronary heart disease among women. <i>JAMA</i>. 2016;315(16):1726-1734. • Hatch EE, Hahn KA, Wise LA, Mikkelsen EM, Kumar R, Fox MP, Brooks DR, Riis AH, Sorensen HT, Rothman KJ. Evaluation of Selection Bias in an Internet-based Study of Pregnancy Planners. <i>Epidemiology</i>. 2016;27(1):98-104.
Asynchronous Lectures	<ul style="list-style-type: none"> • Internal vs. External Validity • Random and Systematic Error • Direction of Bias • Selection Bias Basics • Selection Bias Example • Types of Selection Bias • How Do You Address?
Live Session	Check-In, Review, Team Case Study Breakouts, Report Out, Wrap-Up
Assignments/Deadlines	<ul style="list-style-type: none"> • Case Study Preparation 7 • Team Case Study 7 • Reflection 2

Topic	8. Systematic Error-Information Bias
Competency or Foundational Knowledge	<p>MC01. Apply epidemiological methods to the breadth of settings and situations in public health practice.</p> <p>MC02. Select quantitative and qualitative data-collection methods appropriate for a given public health context.</p>
Learning Objectives	<ul style="list-style-type: none"> • Define information bias, and list the major sources of information bias in epidemiologic studies.

	<ul style="list-style-type: none"> • Discuss the differences between differential and nondifferential misclassification. • Explain the effect that nondifferential and differential misclassification bias can have on the measures of association in a given study. • Describe how information bias can be reduced in epidemiologic studies. • Explain the connection of misclassification with screening tools.
Required Readings	<ul style="list-style-type: none"> • ERIC Notebook: “Information Bias and Misclassification” and “Sensitivity and Specificity.” • Aschengrau, skim Chapter 10, pp. 276–289; Chapter 16, pp. 417–427. • Rothman, K. <i>An introduction to epidemiology</i>, pp. 98–101. • Hatcher SM, Rhodes SM, Stewart JR, Silbergeld E, Pisanic N, Larsen J, Jiang S, Krosche A, Hall D, Carroll KC, Heaney CD. 2017. The prevalence of antibiotic-resistant <i>Staphylococcus aureus</i> nasal carriage among industrial hog operation workers, community residents, and children living in their households: North Carolina, USA. <i>Environ Health Perspect</i> 125:560-569. • M. Baym, R. Kishony, R. Groleau, T. Lieberman, R. Chait. Sep 8, 2016. A giant petri dish exposes the evolutionary dynamics behind antibiotic resistance. Youtube Video clip https://youtu.be/yybsSqcB7mE
Asynchronous Lectures	<ul style="list-style-type: none"> • Information Bias Overview • Sources of Information Bias • Misclassification • Real-Life Example from the Field • Explaining Misclassification With 2x2 Tables • Addressing Information Bias • Population-Based Screening: Misclassification in Another Context • Example and Cautionary Note on Term “Recall Bias”
Live Session	Check-In, Review, Team Case Study Breakouts, Report Out, Wrap-Up
Assignments/ Deadlines	<ul style="list-style-type: none"> • Case Study Preparation 8 • Team Case Study 8

Week/Topic	9. Systematic Error-Confounding, Part 1
Competency or Foundational Knowledge	<p>MC01. Apply epidemiological methods to the breadth of settings and situations in public health practice.</p> <p>MC04. Interpret results of data analysis for public health research, policy, or practice.</p>
Learning Objectives	<ul style="list-style-type: none"> • Distinguish between effect measure modification and confounding. • Describe methods to evaluate effect measure modification. • Describe methods to control for confounding in both the design and analysis of a study. • Distinguish between potential confounders and real confounders.
Required Readings	<ul style="list-style-type: none"> • ERIC Notebook: “Confounding Bias, Part II and Effect Measure Modification.”

	<ul style="list-style-type: none"> • Slideset: Esophageal Cancer in North China: A Classic Case Study • Epidemiology of esophageal cancer in Japan and China. Lin Y, Totsuka Y, He Y, Kikuchi S, Qiao Y, Ueda J, Wei W, Inoue M, Tanaka H. <i>J Epidemiol.</i> 2013;23(4):233-42. Epub 2013 Apr 27. • Merchant, A. T., & Pitiphat, W. (2002). Directed acyclic graphs (DAGs): An aid to assess confounding in dental research. <i>Community Dentistry and Oral Epidemiology</i>, 30, pp. 399–404. • Excerpt from Westreich, D. (2018). <i>Epidemiology By Design</i>. Oxford University Press, forthcoming (expected 2019)by design. On DAGs. (book chapter). • Aschengrau, skim Chapter 11, pp. 293–309; Chapter 13, EMM, pp. 349–352
Asynchronous Lectures	<ul style="list-style-type: none"> • Introduction to Confounding and Effect Measure Modification • Effect Measure Modification • Basics of Confounding • Strategies for Assessing Confounding • Strategies to Address Confounding and Key Points • Statistical Analysis for Evaluating Confounding • Directed Acycle Graphs (DAGS) -slides only
Live Session	Check-In, Review, Team Case Study Breakouts, Report Out, Wrap-Up
Assignments/Deadlines	<ul style="list-style-type: none"> • Case Study Preparation 9 • Team Case Study 9 • Quiz 2 Study Design and Systematic Error

Week/Topic	10. Systematic Error-Confounding, Part 2
Competency or Foundational Knowledge	<p>MC01. Apply epidemiological methods to the breadth of settings and situations in public health practice.</p> <p>MC02. Select quantitative and qualitative data-collection methods appropriate for a given public health context.</p> <p>MC04. Interpret results of data analysis for public health research, policy, or practice.</p>
Learning Objectives	<ul style="list-style-type: none"> • Explain how regression modeling is used to address confounding. • Explain the relationship between stratified analysis and regression modeling for confounding and effect measure modification.
Required Readings	<ul style="list-style-type: none"> • Aschengrau, skim Chapter 13, EMM, pp. 349–352. • Case study–related readings. • Tai et al. 2017. Hot food and beverage consumption and the risk of esophageal squamous cell carcinoma. <i>Medicine.</i> 96:50
Asynchronous Lectures	<ul style="list-style-type: none"> • Distinctions Between EMM and Confounding • Introduction to Modeling • Logistic Regression • Assessing Confounding Using Logistic Regression

	<ul style="list-style-type: none"> Types of Models, Limitations, Building Models Conducting Logistic Regression in Stata
Live Session	Check-In, Review, Team Case Study Breakouts, Report Out, Wrap-Up
Assignments/Deadlines	<ul style="list-style-type: none"> Case Study Preparation 10 Team Case Study 10 Team Peer Evaluation 2

UNIT 4: Concept Integration

Week/Topic	11. Integration. Critiquing Public Health Evidence: Part I. Journal Article Critique
Competency or Foundational Knowledge	<p>MC01. Apply epidemiological methods to the breadth of settings and situations in public health practice.</p> <p>MC04. Interpret results of data analysis for public health research, policy, or practice.</p>
Learning Objectives	<ul style="list-style-type: none"> Describe how an epidemiologic journal article critique incorporates concepts of study design, measures of occurrence and association, and systematic error. Apply article evaluation criteria to critically review an epidemiologic journal article.
Required Readings	<ul style="list-style-type: none"> Aschengrau, skim Chapter 14, pp. 363–387. Vandenbroucke JP1, von Elm E2, Altman DG3, Gøtzsche PC4, Mulrow CD5, Pocock SJ6, Poole C7, Schlesselman JJ8, Egger M9; STROBE Initiative. 2014. Strengthening the Reporting of Observational Studies in Epidemiology (STROBE): explanation and elaboration. <i>Int J Surg.</i> Dec;12(12):1500-24. doi: 10.1016/j.ijsu.2014.07.014. Epub 2014 Jul 18.
Asynchronous Lectures	<ul style="list-style-type: none"> Overview of Critiquing Journal Articles Overview of Strobe Guidelines Journal Article Critique, Example 1 Journal Article Critique, Example 2 Journal Article Critique, Example 3 Preparation for the Case
Live Session	Check-In, Review, Team Case Study Breakouts, Report Out, Wrap-Up
Assignments/Deadlines	<ul style="list-style-type: none"> Case Study Preparation 11 Team Case Study 11 Reflection 3 Exam 2, Systematic Error Team Project Journal Article given to teams

Week/Topic	12. Causal Thinking. Bradford Hill Guidelines and the Evidence Base. Complementary approaches
Competency or Foundational Knowledge	MC01. Apply epidemiological methods to the breadth of settings and situations in public health practice.

	MC04. Interpret results of data analysis for public health research, policy, or practice.
Learning Objectives	<ul style="list-style-type: none"> Recognize approaches to understanding causality and causal inference. Describe the nine Bradford Hill Criteria (Guidelines), and give example of how these have been used in recent public health investigations.
Required Readings	<ul style="list-style-type: none"> ERIC Notebook: "Causality" (overlaps with lecture). Aschengrau, skim Chapter 15, 389–387.
Asynchronous Lectures	<ul style="list-style-type: none"> Introductory Example Introduction to Causes Bradford Hill Criteria Other Approaches to Causal Inference Epidemiology and the Law
Live Session	Check-In, Team Article Critique work. Consult with Section Instructor, Wrap-Up,
Assignments/Deadlines	Quiz 3: Article Critique (1 hour) is due 48 hours after live session. Section Instructor "opens" Final Exam

Week/Topic	13. Critiquing Public Health Evidence. Part 2. Course Wrap-Up and Debriefing
Competency or Foundational Knowledge	<p>MC01. Apply epidemiological methods to the breadth of settings and situations in public health practice.</p> <p>MC02. Select quantitative and qualitative data-collection methods appropriate for a given public health context.</p> <p>MC04. Interpret results of data analysis for public health research, policy, or practice.</p>
Learning Objectives	<ul style="list-style-type: none"> Apply epidemiologic concepts (study design, measures of occurrence and association, systematic error) in reading population-based health news and peer-reviewed journal article. Critique a health news story and related peer-reviewed journal article on their reported epidemiologic measures and methods. Communicate critical review of news stories and their related peer-reviewed journal article.
Required Readings	None
Asynchronous Lectures	<ul style="list-style-type: none"> Overview of Reading the Public Health News Example of a PH News Critique How Can We Better Investigate the Research Question? Public Health News Critique
Live Session	Team Course Evaluation. Course Wrap-Up
Assignments/Deadlines	<ul style="list-style-type: none"> Team Article Critique Final Exam: Journal Article Critiques (in a 3 day time window (time of your own choosing))

	<ul style="list-style-type: none">• Team Peer Evaluation 3• Reflection 4
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Appendix: Rubrics

Journal Article Critique Rubric

	Fully Met	Partially Met	Not Met
Abstract & Title (2 points)	(2 points)	(1 point)	(0 points)
<i>Key Components</i>			
1). States if title is reflective of the article 2). Summarizes what was done from the methods section of the abstract 3). Summarizes abstract main findings (results) 4). Discusses if there were any issues with Abstract (ex: missing population n's, missing measure of association)	All 4 components met	2-3 components met	0-1 component met
Introduction (2 points)	(2 points)	(1 point)	(0 points)
<i>Key Components</i>			
1). State study aims / research questions 2). State hypothesis	All 2 components met	1 component met	0 components met
Methods (3 points)	(3 points)	(2 points)	(1 point)
<i>Key Components</i>			
1). State the study design and participant population 2). Discuss how the exposure and outcome is defined and measured 3). Discuss advantages and disadvantages of study design 4). Discuss statistical analysis plan including, measure of association, confounding, EMM, sensitivity analyses and possible biases in the method	All 4 components met	2-3 components met	0-1 component met
Results (3 points)	(3 points)	(2 points)	(1 point)
<i>Key Components</i>			
1). Discuss the characteristics and number of study participants and loss to follow-up/non-response			

2). Discuss the number of participants with outcome, or cases and controls 3). Discussion of adjusted estimates and the confounders used in the analysis (explain rationale for inclusion of covariates) 4). Discuss any sensitivity analysis, interactions or subgroup analyses (if applicable)	All 4 components met	2-3 components met	0-1 components met
Discussion (3 points)	(3 points)	(2 points)	(1 points)
<i>Key Components</i>			
1). Summary of results and comparison to relevant literature 2). Discussion of the strengths, limitations of the study 3). Discussion of systematic error, external, and internal validity of the study 4). Discussion of Bradford Hill Causal Criteria (N/A is acceptable for any criteria not matched)	All 4 components met	2-3 components met	0-1 components met
Summary Paragraph (2 points)	(2 points)	(1 point)	(0 points)
<i>Key components</i>			
1). Summarizes articles main strengths limitations and biases 2). States a recommendation to accept or reject manuscript for publication.	All 2 components met	1 component met	0 components met

Case Studies

Individual Case Study Preparation (10 point scale)

	Fully Met	Partially Met	Not Met
Completion (4 points)	Completes 100% of questions. Completeness includes fully fleshed out interpretation and complete sentences. Provides calculations and units for all results, when applicable. (3-4 points)	Completes 80-99% of questions. Completeness includes interpretations and complete sentences. Provides calculations, and units for majority	Completes less than 80% of questions interpretations missing, incomplete sentences or only provides one word answer. Doesn't provide calculations and units for

		of results, when applicable. (2-3 points)	calculation type questions, when applicable. (0-1 points)
Clarity (2)	Answers (100%) are easy to follow, and logically presented. (1-2)	Most of answers (80-99%) are easy to follow, and logically presented. (1 point)	Less than 80% of answers are logically presented. (0 points)
Critical Thinking/ Thoughtfulness (4 points)	Clear evidence of critical thinking /thoughtfulness on all (100%) questions. Provides rationale for all answers, clearly reasoned. Answer does not have to be correct. (3-4 points)	Evidence of critical thinking on most questions. Responses address most questions. misses key element. Provides rationale for most answers, clearly reasoned. Answer does not have to be correct. (2-3 points)	Minimal effort evident. Little to know evidence of critical thinking. Responses are incomplete and don't address the questions. Answers don't illustrate thought process. (0-1 points)

*For late submission, the general policy is 10% off points off per day for exams and team related work. Late case study preparation assignments will receive zero points if submitted later than class in which they are reviewed.

Team case study (10 point scale)

	Fully Met	Partially Met	Not Met
Completion and Clarity (3 points)	Completes 100% of questions. Completeness includes fully fleshed out interpretation and complete sentences. Provides calculations and units for all results, when applicable. Answers (100%) are logically presented. (2-3 points)	Completes 80-99% of questions. Completeness includes interpretations and complete sentences. Provides calculations, and units for majority of results, when applicable. Most of answers (80-99%) are logically presented. (1-2 points)	Completes less than 80% of questions interpretations missing, incomplete sentences or only provides one word answer. Doesn't provide calculations and units for calculation type questions, when applicable. Less than 80% of answers are logically presented. (0-1 points)
Critical Thinking/ Thoughtfulness (3 points)	Clear evidence of critical thinking /thoughtfulness on all (100%) questions. Provides rationale for all answers, clearly reasoned. (2-3 points)	Evidence of critical thinking on most questions. Responses address most questions. misses key element. Provides rationale for most	Minimal effort evident. Little to know evidence of critical thinking. Responses are incomplete and don't address the questions. (0-1 points)

		answers, clearly reasoned. (1-2 points)	
Accuracy (4)	All questions are correctly answered. (3-4 points)	Most questions (80% or more) correctly answered. (1-2points)	Less than 80% of questions are correctly answered. (0-1points)

For late submissions, the general policy is 10% off points off per day.

Reflections

Reflections Grading Rubric (10 point scale)

	Fully Met	Partially Met	Not Met
Clarity (4)	Clearly written and organized. (3-4 points)	Clearly written and not well organized. <i>or</i> Not clearly written, but well organized (1-2 point)	Not well organized or written. (0 points)
Critical Thinking/ Thoughtfulness (6 points)	Clear evidence of critical thinking /thoughtfulness on reflection.. Clearly connects concepts in two or more courses in reflection. Connects with previous work or life experience [not required, but enriches reflection] (5-6 points)	Some evidence of critical thinking /thoughtfulness on reflection. Connects concepts between two courses in reflection. Connects with previous work or life experience [not required, but enriches reflection] (3-4 points)	Minimal effort evident. No evidence of critical thinking /thoughtfulness on reflection. No mention of courses, or no connections made in reflection. (0-2 points)

Team Peer Evaluation

Team Peer Evaluation (5 point scale for each aspect, then score averaged.)

	Strongly Agree (5)	Agree (4)	Neither Agree or Disagree (3)	Disagree (2)	Strongly Disagree (1)
This team member actively and consistently participated in the team case studies.					
This team member accomplished tasks on time.					
This team member's work reflected an acceptable level of thought and effort.					

This team member functioned as a valuable member of the team by supporting the efforts of fellow team members.					
Overall, this team member did an excellent job working on and participating in the team case studies.					
Overall, this team member did an excellent job working on and participating in the Team Project.					

Team Project

The Team Article Critique will be assessed using a standardized grading rubric, which is the same as the Final Exam grading rubric (Exam 3).