

PUBH 2010: Epidemiological Concepts and Methods for Public Health
UNT College of Health and Public Service
Fall 2022

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Course website: <https://unt.instructure.com/courses/75348>

“...it is the knowledge about the way in which the disease is propagated which will cause them to disappear.”

- John Snow

Course Format

This course will be held entirely online, with the opportunity to meet with the professor over Zoom as needed. Students are expected to:

1. Complete the readings for each module before viewing the course material online.
2. Watch all lecture (videos) and supplemental materials for each module.
3. Take quizzes and complete the homework assignments on time.
4. Participate in class discussions.

The class format will include lectures (videos), thought questions, homeworks, discussions, quizzes, and projects as described below. The course website will show the steps students should follow in each module.

Course Outline

Epidemiology is the systematic and rigorous study of health and disease in a population. The purpose of this course is to introduce you to core concepts in epidemiology as a foundation for further learning in the public health field. You will learn about several aspects of epidemiology and will discover and learn to apply analytical methods to study patterns of disease and injury. Upon learning concepts of inference, bias and confounding you will assess epidemiological associations and causation of disease. You will recognize how to apply these concepts to inform basic and clinical science as well as policy. The course requires problem-based learning of epidemiological concepts and methods, so you will be able to use epidemiology as a scientific tool for addressing the health needs of the community.

Required Readings

Friis, Epidemiology 101, second edition. Other readings will be available on the course website.

Two copies of the course textbook are on reserve at the library.

Objectives

To familiarize you with how epidemiology contributes to:

1. The understanding of the causes and natural course of disease of all kinds,
2. The control of disease in human populations, and
3. Scientific judgment and inquiry in public health problems.

By successfully completing this course, you should be able to:

1. Discuss the role of epidemiology within the broader field of public health
2. Discuss the principles of disease prevention within populations
3. List and describe key terms used in the epidemiology and prevention of infectious disease
4. Calculate and interpret basic population measures of health and disease occurrence including incidence, prevalence, and survival
5. Make appropriate comparisons of disease rates within and between populations
6. Distinguish between basic measures of association, including rate ratio, risk ratio, incidence density ratio, odds ratio, attributable risk, and population attributable risk
7. Select and apply fundamental epidemiologic study designs including randomized clinical trial, cohort, case-control, and ecologic for the purpose of investigating public health problems
8. Identify the role of bias and confounding in epidemiologic research and apply methods appropriate to assessment of confounding and various types of bias
9. Differentiate between various epidemiologic study designs and compare their respective strengths and weaknesses
10. Critique published epidemiological studies and identify their strengths and weaknesses

Association of Schools of Public Health (ASPH) competencies covered in class (epidemiology specific):

After completion of this course, you should be able to:

1. Identify key sources of data for epidemiologic purposes.
2. Identify the principles and limitations of public health screening programs.
3. Describe a public health problem in terms of magnitude, person, time and place.
4. Explain the importance of epidemiology for informing scientific, ethical, economic and political discussion of health issues.
5. Comprehend basic ethical and legal principles pertaining to the collection, maintenance, use and dissemination of epidemiologic data.
6. Apply the basic terminology and definitions of epidemiology.
7. Calculate basic epidemiology measures.
8. Communicate epidemiologic information to lay and professional audiences.
9. Draw appropriate inferences from epidemiologic data.
10. Evaluate the strengths and limitations of epidemiologic reports.

Council on Education for Public Health Foundational Competencies for Bachelor's Degrees (epidemiology specific):

1. You will develop the ability to locate, use, evaluate and synthesize public health information.

Class Schedule

Week 1: August 21--August 27; Course Introduction		
Video lectures	Readings: all readings are from Friis, Epidemiology 101, 2nd edition, unless otherwise specified.	Homeworks /quizzes / discussions

Epi 100 Introductory lecture	Chapter 1, p 1-8. Chapter 5, pages 103-107 and 112-126.	HW1: Correlation and causation
Week 2: August 28-Sept3; Studying Populations		
Studying populations	Chapter 2. Page 199 of your book: "Natural history of disease," including information on the three levels of prevention.	HW2: person-time
Week 3: Sept 4--Sept 10; Age Adjustment		
Age adjustment/ a.k.a. direct standardization	Chapter 3, pages 69-75.	
Week 4: Sept 11--Sept 17 ; Outbreak Investigations		
Outbreak investigation: Ebola	Chapter 10.	HW3: first part of case study
Week 5: Sept 18--Sept 24; Measures of Association		
	Chapter 3, pages 57-69	HW4: Case study part 2
Week 6: Sept 25--Oct. 1; Sources of Public Health Data		
	Chapter 4: "Data and disease occurrence."	
Week 7: Oct. 2--Oct. 8; Overview of Study Designs		
Overview of study designs	Chapter 7, pages 147-160.	Quiz 1: on weeks 1-6
Week 8: Oct. 9--Oct.15; Intervention Studies		
Clinical Trials	Chapter 7, "Experimental Studies," pages 158-160.	
Week 9: Oct. 16--Oct.22; Cohort Studies		
Cohort studies	Chapter 7, "Cohort Studies," pages 155-158.	
Week 10: Oct. 23--Oct. 29; Case-Control Studies		
Case-control studies	Chapter 7, "Case-Control Studies," pages 153-155.	Case Study part 3
Case-Control Example: renal cell cancer		
Week 11: Oct. 30--Nov. 5; Ecologic Studies		

Ecological studies, Random error	Chapter 7, "Ecologic studies," pages 150-153. Chapter 5, "Types of Descriptive Epidemiologic Studies," pages 107-112.	
Week 12: Nov. 6--Nov.12; Bias and Confounding		
Bias, confounding	Chapter 7, "Confounding," in Foundations of Epidemiology, M. Bovbjerg. Available from: Link to Chapter on Confounding Chapter 6, "Bias," in Foundations of Epidemiology, M. Bovbjerg. Available from: Link to the Chapter of Bias	Quiz on study designs, weeks 7-11
Week 13: Nov. 13--Nov 19; Screening		
Screening	Chapter 9	
Week 14: Nov. 20-Nov. 26; Causal Inference		
Causal inference	Chapter 6, "Association and Causality."	
Week 15-16: Nov. 27-Dec. 10; Critical Review of Epi Studies and Final		
Review of studies	Chapter 9, "Study designs revisited," in Foundations of Epidemiology, M. Bovbjerg. Available from: https://open.oregonstate.education/epidemiology/chapter/study-designs-revisited/	Final Project Due

Assessment

Quizzes (40% of grade)

Quizzes will address concepts from the modules. Questions will be short answer, multiple choice, true/false, calculations, and will ask you to show your work. Quizzes are closed book and must be done individually. Students who cannot take quizzes due to extenuating circumstances should inform the instructor as soon as possible of the illness/situation. Extenuating circumstances are defined as severe personal illness (medical note required) or circumstances beyond the student's control.

Homeworks (41% of grade)

Homework assignments are aimed for you to apply epidemiologic principles. Homeworks will be posted on the course website.

Homework directions:

- 1) Download the homework from Canvas. Write succinct answers that include a brief explanation or statement of support.
- 2) Upload your homework answers to Canvas by **Sunday night of each week** by midnight (**PDF or Word copy accepted**). To show your work, upload the Word/PDF document of the homeworks within the homework page.

Final Project (15%) and critiquing other student presentations (4%)

You will be asked to read and prepare a video presentation of an epi outbreak investigation.

Late work

There is a **10% penalty for every 24 hours** that homework or assignments are late. **After 5 days you will receive a 0 for any late work.** Late reviews will receive a grade of 0 unless there are extenuating circumstances.

Academic Integrity

According to UNT Policy 06.003, Student Academic Integrity, academic dishonesty occurs when students engage in behaviors including, but not limited to cheating, fabrication, facilitating academic dishonesty, forgery, plagiarism, and sabotage. A finding of academic dishonesty may result in a range of academic penalties or sanctions ranging from admonition to expulsion from the University.

All material in this course is copyrighted. You do not have permission to share or upload course materials. If the instructor determines that you have shared course materials on an external website, you will receive a 0 for the assignment and will be reported to the Dean of Students.

Emergency Notification & Procedures

UNT uses a system called Eagle Alert to quickly notify students with critical information in the event of an emergency (i.e., severe weather, campus closing, and health and public safety emergencies like chemical spills, fires, or violence). In the event of a university closure, please refer to Blackboard for contingency plans for covering course materials.

Accessibility

All lectures will be available in closed caption format.

Your success in this class is important to me. Please let me know if there is anything I can do to help you better understand the materials in this course, and I will try to do it if we can. Work with me; together we can develop strategies to maximize your learning potential, your understanding of the course material, and your demonstration of that understanding.

Students with Disabilities

All students taking this class are valued and it is important to me that students with disabilities are appropriately accommodated.

The University of North Texas makes reasonable academic accommodation for students with disabilities. Students seeking reasonable accommodation must first register with the Office of Disability Access (ODA) to verify their eligibility. If a disability is verified, the ODA will provide you with a reasonable accommodation letter to be delivered to faculty to begin a private discussion regarding your specific needs in a course. You may request reasonable accommodations at any time, however, ODA notices of reasonable accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of reasonable accommodation for every semester and must meet with each faculty member prior to implementation in each class. Students are

strongly encouraged to deliver letters of reasonable accommodation during faculty office hours or by appointment. Faculty members have the authority to ask students to discuss such letters during their designated office hours to protect the privacy of the student. For additional information, refer to the Office of Disability Access website at <http://www.unt.edu/oda>. You may also contact ODA by phone at (940) 565-4323.