PURDUE UNIVERSITY | Department of Public Health

PUBH 535: Fundamentals of Epidemiology

Purdue University, Fall 2023
Distance delivery, 8-week course
3 credit hours, (135 total contact hours)
Approximately 14-18 hours per week

Instructor: Dr. Michael Reger, PhD, MPH
Preferred Pronouns: he, him
Email: reger0@purdue.edu
How to contact the instructor: Email
Virtual Office Hours: By Appointment

Course Description

This course is an introduction to epidemiology, the study of the patterns, causes, and impact of disease in populations. Epidemiology comprises an important part of public health and medical surveillance and research, and is a key tool for health policy development. This course will discuss the basic principles and methods of epidemiology, including measurements of disease occurrence and association, study designs, and determination of causality. Contemporary examples will be used to illustrate the application of these concepts.

Prerequisites

It is an expectation that you have proficiency in completing computer-related tasks such as browsing the internet, creating Microsoft PowerPoint (electronic) presentations, creating, and editing existing Microsoft Word documents, uploading and downloading documents to the course website and saving electronic files to the appropriate directory. These skills are prerequisites for this course.

Learning Outcomes

CEPH Foundational Competencies

Our Master of Public Health (MPH) program is accredited by the Council on Education for Public Health (CEPH). CEPH has identified 22 Foundational Competencies. These competencies are informed by the traditional public health core knowledge areas (biostatistics, epidemiology, social and behavior sciences, health services administration, and environmental health sciences), as well as cross-cutting and emerging public health areas. Listed below are the Foundational Competency expectations for students completing this course:

1: Apply epidemiological methods to settings and situations in public health practice.

2: Select quantitative and qualitative data collection methods appropriate for a given public health context.

In addition to the Foundational Competencies outlined above, this course also fulfills the following Foundational Knowledge Learning Objectives as defined by CEPH:

1: Explain public health history, philosophy, and values.

2: Identify the core functions of public health and the 10 Essential Services.

4: List major causes and trends of morbidity and mortality in the US or other community relevant to the school or program.

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

Course Outcomes

- Describe major models of disease causation and prevention
- Calculate the extent of disease in populations
- Identify and utilize appropriate epidemiologic study designs
- Estimate the association between exposure and disease
- Differentiate between association and causation
- Explain and employ the use of epidemiologic tools in public health and clinical practice
- Review and critique basic epidemiology studies

Learning Resources, Technology & Texts

Required Texts

The required textbook for this course is *Celentano, David and Szklo, Moyses. Gordis Epidemiology. 6th ed. Elsevier, 2019. ISBN: 0323552293*
Amazon Link: Gordis Epidemiology

Students can purchase their copy or access an electronic copy on the Purdue Libraries website. There is a limited number of users who can access the electronic version provided by Purdue University at the same time. To ensure ease of access, students can download sections of the textbook for offline use.

Additional required readings will be posted on Engage.

Required Software

Epidemiologists routinely use computer software for statistical calculations. In this course, we will be using Microsoft Excel. Some epidemiologists use other computer programs (SPSS, SAS, Stata, and R. Students can obtain SAS from Purdue University.

Course Structure

This course is organized into eight, self-paced, weekly modules. Most weekly modules include readings, homework assignments, discussions, lectures, and videos. Students are expected to complete each weekly activity as outlined in the instructions. You will have a final project due at the end of the course. Weeks begin on Monday (day 1) and end on Sunday (day 7). Due dates are listed as module days in each assignment.

Assignments

Assignments	*% of Total Grade*
Descriptive Project (Week 4)	20
Proposal Project (Week 8)	30
Discussions (Weeks 1-8)	25
Homework Assignments (Weeks 1-7)	25

Weekly Assignment Summary

Assignment	Due Date and Time	Point Value
Week 1 - Introduction to the Field and History of Epidemiology		
DB 1A: Introduction	Initial Post: Wednesday 11:59PM Replies: None	0
DB 1B: Infectious Disease for Descriptive Project	Initial Post: Saturday 11:59PM Replies: None	0
DB 1C: Historical Person in Epidemiology	Initial Post: Wednesday 11:59PM Replies: Saturday 11:59PM	50
Homework Assignment 1	Sunday 11:59PM	25
Week 2 - Descriptive Epidemiology		
DB 2: Descriptive Epidemiology	Initial Post: Wednesday 11:59PM Replies: Saturday 11:59PM	50
Homework Assignment 2	Sunday 11:59PM	25
Week 3 - Measures of Disease Occurrence		
DB 3: Notifiable Diseases and Statistics	Initial Post: Wednesday 11:59PM Replies: Saturday 11:59PM	50
Homework Assignment 3	Sunday 11:59PM	25
Week 4 - Epidemic Investigations		
DB 4: Field Investigation	Initial Post: Wednesday 11:59PM Replies: Saturday 11:59PM	50
Descriptive Project	Sunday 11:59PM	100
Week 5 - Fundamentals of Study Design and Cohort Studies		
DB 5: Study Design	Initial Post: Wednesday 11:59PM Replies: Saturday 11:59PM	50
Homework Assignment 4	Sunday 11:59PM	25
Week 6 - Case-Control Studies		
DB 6: Study Design 2	Initial Post: Wednesday 11:59PM Replies: Saturday 11:59PM	50
Homework Assignment 5	Sunday 11:59PM	25
Week 7 - Experimental Studies		
DB 7: Study Comparison	Initial Post: Wednesday 11:59PM Replies: Saturday 11:59PM	50
Homework Assignment 6	Sunday 11:59PM	25
Week 8 - The Epidemiologic Transition		
DB 8: PowerPoint Showcase	Initial Post: Wednesday 11:59PM Replies: Saturday 11:59PM	50
Proposal Project	Wednesday 11:59PM	100

Discussions (25% of Total Grade)

Each week you will contribute to a discussion on a concept or topic we have studied in this course. Your conversation will take place in the Discussion Forum area. Make your initial response to the discussion prompt by **Wednesday, 11:59 pm ET**. After making your initial post, check back often to continue engaging in the discussion. You are required to make at least two follow up posts to your peers before **Saturday, 11:59 pm ET**.

Be thoughtful in your response to your classmates. Ask your peers follow up questions, and respond in a way that will keep the conversation alive. You are encouraged to dig deep for this assignment. Your responses will be evaluated based upon participation, quality, support and mechanics. Exercise good judgement. Any opinion offered, must be supported by fact. Find more information on the Discussion Board **Requirements** in the "Getting Started" section of BrightSpace.

Homework Assignments (25% of Total Grade)

Homework assignments will be due throughout the 8 weeks of the course. All homework will be submitted through BrightSpace before the end of the day on the due date listed in the weekly assignment summary. No late homework will be accepted unless permission is granted prior to the due date. Even if permission is not granted, I still encourage you to submit assignments for feedback.

Descriptive Project (20% of Total Grade)

The purpose of this project is for you to demonstrate your understanding of descriptive epidemiology by presenting information on an infectious disease of your choice. You will prepare a PowerPoint presentation with 20-30 slides which should also include speaker's notes that expand upon the information on the slides. More information on the project will be available on BrightSpace at the start of the course.

Proposal Project (30% of Total Grade)

The purpose of this exercise is to give you an opportunity to design an epidemiologic study, and in so doing, think through a series of methodological issues. Students will be assigned to groups of between two and four for this project, depending on the class size. I am aware of the pit-falls of group projects, but I want you to work as a group for this exercise for two reasons: first, many real world projects are completed by a team and you need to know how to help make a team effective; second, this project requires a great deal of effort – more than is normally expected by a single individual – thus, by working as a team the tasks can be shared. If any issues arise with a member of the team, you should notify me immediately.

For this exercise your group will develop a proposal for an epidemiologic study. You should expect to spend a considerable amount of time with your group members working on this project. Your group will submit a PowerPoint presentation and will also present the proposal to the class via the final discussion board. Presentations are expected to be developed using PowerPoint, should be between 15-20 minutes in length, and all members of the group are expected to speak. More information on the project will be available on BrightSpace at the start of the course.

Grading Policies

Grading scale

Assignment of the final letter grade for the course will be calculated as follows.

A, A+	94-100%	B-	80-83%	D+	67-69%
A-	90-93%	C+	77-79%	D	64-66%
B+	87-89%	C	74-76%	D-	60-63%
B	84-86%	C-	70-73%	F	<60%

****So there will be no misunderstandings: I will NOT give additional points towards your final grade. In other words, an 89.5% or an 89.999% is a B+, etc.**

Course Schedule

Week	Topics	Readings and Lectures	Assignments Due
1	Introduction to the Field and History of Epidemiology	**Textbook** 1) Gordis Epi Chapter 1 **Lecture** 2) PUBH 535 - Epidemiology Introduction and History (PowerPoint) **Supplemental Reading** 3) CDC - Introduction to Epidemiology (Supplemental PowerPoint)	**Discussion 1A** **Discussion 1B** **Discussion 1C** **Homework 1**
2	Descriptive Epidemiology	**Textbook** 1) Gordis Epi Chapter 2 **Lecture** 2) PUBH 535 - Descriptive Epidemiology (PowerPoint) **Supplemental Reading** 3) COVID Descriptive Epidemiological Study (PDF)	**Discussion 2** **Homework 2**
3	Measures of Disease Occurrence	**Textbook** 1) Gordis Epi Chapters 3 and 4 **Lecture** 2) PUBH 535 - Measures of Disease Occurrence **Supplemental Reading** 3) Incidence and Prevalence Supplement (PDF) 4) Incidence vs. Prevalence (PDF)	**Discussion 3** **Homework 3**
4	Epidemic Investigations	**Textbook** 1) Gordis Epi Chapter 2 **Lecture** 2) PUBH 535 - Epidemic Investigation **Supplemental Reading** 3) Investigation of Outbreaks (PDF) 4) Outbreak Investigation Guide Example (PDF)	**Discussion 4** **Descriptive Project**
5	Fundamentals of Study Design and Cohort Studies	**Textbook** 1) Gordis Epi Chapters 6, 7, 8, and 12 **Lecture** 2) PUBH 535 - Fundamentals of Study Design 3) PUBH 535 - Cohort Studies **Supplemental Reading** 4) Cohort Studies (PDF) 5) Cohort Studies: Design, Analysis, and Reporting (PDF)	**Discussion 5** **Homework 4**
6	Case Control Studies	**Textbook** 1) Gordis Epi Chapter 10 **Lecture** 2) PUBH 535 - Case-Control Studies **Supplemental Reading** 3) Case-Control Studies (PDF) 4) Case-Control Studies - Methodology (PDF) 5) Interpreting Results of Case-Control Studies (PDF)	**Discussion 6** **Homework 5**

7	Experimental Studies	**Textbook** 1) Gordis Epi Chapter 11 **Lecture** 2) PUBH 535 - Experimental Studies **Supplemental Reading** 3) Randomized Controlled Trials (PDF) 4) Community Intervention Tobacco Study (PDF)	**Discussion 7** **Homework 6**
8	The Epidemiologic Transition	**Lecture** 1) PUBH 535 - Epidemiologic Transition **Supplemental Reading** 2) Epidemiologic Transition - Changing Patterns (PDF)	**Discussion 8** **Proposal Project**

How to Succeed in This Course

This course is fast paced and requires time. However, you can be successful in this course if you plan. Here are a few tips that may help you succeed in this course:

- Obtain the text electronically or physically as soon as possible.
- Acquaint yourself with the syllabus. It is a good idea to read it through in its entirety at the beginning, so you can plan accordingly.
- It is often tempting to bypass the readings. The assigned readings contain the information you will need to be successful in your homework and projects.
- Pay attention to common terms in epidemiology: morbidity, mortality, incidence, prevalence, Odds Ratio, Relative Risk, descriptive and analytical statistics, cohort, case-control, retrospective, prospective and cross-sectional studies. These are all terms that you will use throughout this class and throughout Epidemiology if you continue this course
- Participate in class discussions. They are designed to discuss concepts that will assist with all assignments.
- Take advantage of school resources. Familiarize yourself with these resources and how to access them if needed.
- Communicate with your instructor. DO NOT suffer in silence and wait until too late. If there is any concept with which you have having difficulty, reach out to your instructor immediately.

Policies

Course Participation
Students are expected to participate in every week of the courses in which they are enrolled. Only the instructor can excuse a student from a course requirement or responsibility. When conflicts or absences can be anticipated, the student should inform the instructor of the situation as far in advance as possible. When advance notification to an instructor is not possible, the student should contact the instructor as soon as possible by email.

Missed or Late Work
All assignments must be completed by the due date by 11:59 PM ET. Assignments submitted after that are considered late.

Late assignments are only accepted with a reasonable and valid excuse and with prior permission. You must contact your instructor in advance of the due date to get permission to submit a late assignment. Assignments submitted late without prior permission will not be accepted.

Assignments with prior permission for late submission may be accepted up to a maximum of three days late. For each day an assignment is late, it may be subject to a 10% per day deduction (i.e. for assignments submitted one day late, grading starts at 90%; for assignments submitted two days late, grading starts at 80%; for assignments submitted three days late, grading starts at 70%). Assignments submitted more than three days late will not be accepted. Discussion board posts are only accepted during the week in which they are due.

Incompletes

A grade of incomplete (I) will be given only in unusual circumstances. To receive an "I" grade, a written request must be submitted prior to week 6, and approved by the instructor. The request must describe the circumstances, along with a proposed timeline for completing the course work. Submitting a request does not ensure that an incomplete grade will be granted. If granted, you will be required to fill out and sign an "Incomplete Contract" form that will be turned in with the course grades. Any requests made after the course is completed will not be considered for an incomplete grade.

Academic Integrity and Plagiarism

This course adheres to Purdue University's academic integrity policy and the Purdue Honor Pledge. Any violations of academic integrity will result in a penalty commensurate with the activity.

Violations of academic integrity includes but is not limited to: fabrication (i.e., presenting false information or "made up" information), plagiarism (i.e., copying or paraphrasing others' words or ideas and treating them as your own), contract cheating (i.e., hiring a third-party individual or service to complete course assignments) and complicity (i.e., helping another student to commit acts of academic dishonesty). Please refer to https://www.purdue.edu/odos/osrr/academic-integrity/index.html for further discussion of university policies regarding this issue. Course assignments may be submitted to a plagiarism detection software.

Purdue Honor Pledge: *"As a Boilermaker pursuing academic excellence, I pledge to be honest and true in all that I do. Accountable together – We are Purdue."* https://www.purdue.edu/odos/osrr/honor-pledge/about.html

Use of Copyrighted Materials

Online educational environments, like all learning environments, should provide opportunities for students to reflect, explore new ideas, post opinions openly, and have the freedom to change those opinions over time. Students enrolled in and instructors working in online courses are the authors of the works they create in the learning environment. As authors, they own the copyright in their works subject only to the university's right to use those works for educational purposes, available here. Students may not copy, reproduce or post to any other outlet (e.g., YouTube, Facebook, or other open media sources or websites) any work in which they are not the sole or joint author or have not obtained the permission of the author(s).

Accessibility

Purdue University responds to the needs of the students with disabilities through the provision of auxiliary aids and services that allow a student with disability to fully access and participate in the programs, services and activities at Purdue University. It is the student's responsibility to notify the Disability Resource Center (drc@purdue.edu or 765-494-1247) of a condition which may require accommodation. It is also the student's responsibility to inform, in the first week of class, the instructor about the disability and discuss any accommodations.

Nondiscrimination Statement

Purdue University is committed to maintaining a community which recognizes and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her own potential. In pursuit of its goal of academic excellence, the University seeks to develop and nurture diversity. The University believes that diversity among its many members strengthens the institution, stimulates creativity, promotes the exchange of ideas, and enriches campus life. Purdue University prohibits discrimination against any member of the University community on the basis of race, religion, color, sex, age, national origin or ancestry, genetic information, marital status, parental status, sexual orientation, gender identity and expression, disability, or status as a veteran (http://www.purdue.edu/purdue/ea_eou_statement.html). Any student who believes they have been discriminated against may submit a complaint to the Office of Institutional Equity (http://www.purdue.edu/report-hate). Information may be reported anonymously.

Anti-Harassment

Harassment in the workplace or the educational environment is unacceptable conduct and will not be tolerated. Purdue University is committed to maintaining an educational and work climate for faculty, staff and students that is positive and free from all forms of Harassment. This policy addresses Harassment in all forms, including Harassment toward individuals for reasons of race, religion, color, sex, age, national origin or ancestry, genetic information, disability, status as a veteran, marital status, parental status, sexual orientation, gender identity or gender expression. All members of the University community must be able to pursue their goals, educational needs and working lives without intimidation or injury generated by intolerance and Harassment. http://www.purdue.edu/policies/ethics/iiic1.html#statement

Emergencies

In the event of a major emergency, course requirements, deadlines and grading percentages are subject to changes. Relevant changes to this course will be announced on the course website and by email.

You are expected to read your @purdue.edu email on a frequent basis.