DEPARTMENT: Epidemiology

COURSE NUMBER: 530 **SECTION NUMBER:** 3

CREDIT HOURS: 4 **SEMESTER:** Fall 2019

COURSE TITLE: Epidemiologic Methods I

INSTRUCTOR NAMES: Travis Sanchez, DVM, MPH and Patrick Sullivan, DVM, PhD

INSTRUCTOR CONTACT INFORMATION

Travis Sanchez
EMAIL: Travis.Sanchez@emory.edu
PHONE: 404-727-8403
SCHOOL ADDRESS OR MAILBOX LOCATION: GCR 458
OFFICE HOURS: Wednesdays, 1:30-3:00pm

Patrick Sullivan
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SCHOOL ADDRESS OR MAILBOX LOCATION: GCR 464
OFFICE HOURS: Fridays, 11am-12pm

Teaching Assistants:

Section	Name	Email	Office Hours	Lab Time and Location
L10	Gerard Portela	gerard.thomas.portela@emory.edu		Thr 8:30-9:50, GCR L45
L14	Kristin Harrington	kristin.harrington@emory.edu		Thr 8:30-9:50, GCR 115
L15	Grace Kalmus	grace.gardiner.kalmus@emory.edu		Thr 8:30-9:50, CNR 1055
L16	Kurt Vyaz	kartavya.jayant.vyas@emory.edu		Thr 8:30-9:50, CNR 5001
L17	Sophia Le	sophia.le@emory.edu		Thr 8:30-9:50, CNR 1034

All TA office hours will be held in the 3rd floor CNR break room.

COURSE DESCRIPTION

The course introduces the basic concepts and premises of the science of epidemiology. The description of techniques for quantifying disease occurrence (or other health indicators) in the population is followed by the discussion of epidemiologic study designs and measures of associations. The concepts of random variability, bias, and effect modification are also examined.

MPH/MSPH FOUNDATIONAL COMPETENCIES

- Apply epidemiological methods to the breadth of settings and situations in public health practice
- Select quantitative data collection methods appropriate for a given public health context

CONCENTRATION COMPETENCIES

- Formulate a research question and study aims
- Describe distributions of morbidity, mortality and risk factors in terms of magnitude, time, place, and population
- Calculate and interpret basic design-specific measures of association and their standard errors
- Differentiate among the strengths, limitations, and differences and similarities of various study designs
- Differentiate between the main types of effect modification and the methods of recognizing and accounting for it
- Differentiate among different design-specific sources and types of systematic error

COURSE LEARNING OBJECTIVES

- Choose the appropriate study design for a given research question
- Calculate and interpret measures of disease and exposure frequency
- Understand the role and practical applications of surveillance in public health
- Calculate and interpret the appropriate measures of association between an exposure and disease for different study designs (ratio and difference measures, where appropriate)
- Quantify measures of potential impact
- Evaluate screening and diagnostic tests by calculating and interpreting sensitivity, specificity, and predictive values
- Interpret 95% confidence intervals and p-values in the context of how random error affects epidemiologic studies
- Recognize and evaluate the impact of the main sources of systematic error (selection bias, information bias and confounding) in epidemiologic research
- Assess data for confounding and interaction (effect modification)
- Perform simple and stratified analyses of the data
- Describe and calculate measures of reliability in epidemiological studies
- Understand approaches to assessing causal relationships in observational studies

EVALUATION

Basis of Final Grade	
Midterm I	35%
Final Exam	45%
Lab exercises	20%

Lab Grading	
Participation in class (group assignments)	75%
Written homework (individual assignments)	25%

Exam Policies

Midterm exams are given during the class time and are closed book, but you are allowed one (8.5''x11'') sheet of notes, front and back. Calculators will be necessary for exams. The final exam is cumulative and closed book, but you can bring two (8.5''x11'') sheets of notes, front and back.

Final grade:
Students cannot fail (<60%) both exams in this course and still pass this class.

Extra points:
An optional extra credit assignment may be offered at the end of the semester. Details to follow.

Final Grade Point Cutoffs*	
A	95-100
A-	90-94
B+	85-89
B	80-84
B-	75-79
C	70-74
F	<70

*Grades rounded to the nearest whole number

COURSE STRUCTURE

Lecture
This course will consist of two lectures per week supplemented by weekly lab sessions. All pertinent course material will be delivered during the lectures.

Lab
Lab sessions will be used to review homework assignments and key points from lecture and to address any additional course-related questions that students have. The lab assignments includes case studies for discussion in small groups and presentation during class. Answers to one or two questions will have to be submitted individually in writing at the beginning of the lab class.

MPH/MSPH Foundational Competency	Representative Assessment
Apply epidemiological methods to the breadth of settings and situations in public health practice	Final exam
Select quantitative data collection methods appropriate for a given public health context	Midterm

MPH/MSPH Concentration Competency	Representative Assessment
Formulate a research question and study aims	Final exam
Describe distributions of morbidity, mortality and risk factors in terms of magnitude, time, place, and population	Laboratory exercise 2
Calculate and interpret basic design-specific measures of association and their standard errors	Laboratory exercise 5
Differentiate among the strengths, limitations, and differences and similarities of various study designs	Midterm
Differentiate between the main types of effect	Laboratory exercise 6

modification and the methods of recognizing and accounting for it	
Differentiate among different design-specific sources and types of systematic error	Final exam
Interpret individual published epidemiologic studies in which the major epidemiologic study designs are used	Final exam

COURSE POLICIES

Recommended materials:
If you would like a textbook to accompany the course, I recommend that you choose one of the options below. None of these materials is required.

1. Kleinbaum DG. ActivEpi Web. http://activepi.herokuapp.com (free, need to register)
2. Gordis L. Epidemiology WB Sounders Philadelphia (4th ed. 2008 or 5th ed. 2014)
3. Rothman, KJ. Epidemiology: An Introduction, 2nd Edition. Oxford University Press, New York, 2012
4. Szklo, M., Nieto, J. Epidemiology: Beyond the Basics, 3rd Edition. Jones & Bartlett Learning, Burlington, MA, 2014

Attendance is expected at all lectures and lab sessions. Students may miss up to **two (2)** lab sessions, provided **the entire lab** is **completed in writing and submitted to your TA before the lab session**. Late assignments will not be accepted.

Students are required to have a standalone calculator to use for exams. Phones, computers, and other internet-connected devices may not be used as calculators on exams.

Students are permitted to bring **one** 8.5x11 sheet (front and back) with any notes of their choosing to the midterm exam. Students are permitted to bring **two** 8.5x11 sheets (front and back) with any notes of their choosing to the final exam.

As the instructor of this course, I endeavor to provide an inclusive learning environment. However, if you experience barriers to learning in this course, do not hesitate to discuss them with me and the Office for Equity and Inclusion, 404-727-9877.

RSPH POLICIES

Accessibility and Accommodations

Accessibility Services works with students who have disabilities to provide reasonable accommodations. In order to receive consideration for reasonable accommodations, you must contact the Office of Accessibility Services (OAS). It is the responsibility of the student to register with OAS. Please note that accommodations are not retroactive and that disability accommodations are not provided until an accommodation letter has been processed.

Students who registered with OAS and have a letter outlining their academic accommodations are strongly encouraged to coordinate a meeting time with me to discuss a protocol to implement the accommodations as needed throughout the semester. This meeting should occur as early in the semester as possible.

Contact Accessibility Services for more information at (404) 727-9877 or accessibility@emory.edu. Additional information is available at the OAS website at http://equityandinclusion.emory.edu/access/students/index.html

Honor Code

You are bound by Emory University's Student Honor and Conduct Code. RSPH requires that all material submitted by a student fulfilling his or her academic course of study must be the original work of the student. Violations of academic honor include any action by a student indicating dishonesty or a lack of integrity in academic ethics. *Academic dishonesty refers to cheating, plagiarizing, assisting other students without authorization, lying, tampering, or stealing in performing any academic work, and will not be tolerated under any circumstances.*

The RSPH Honor Code states: "Plagiarism is the act of presenting as one's own work the expression, words, or ideas of another person whether published or unpublished (including the work of another student). A writer's work should be regarded as his/her own property." (http://www.sph.emory.edu/cms/current_students/enrollment_services/honor_code.html)

COURSE CALENDAR

Week	Date	Day	Professor	Topic
1	8/28	Wed	Sanchez and Sullivan	Introduction to Epi 530; Overview of Epidemiology
	8/29	Thurs		Lab: Introduction to Epi 530 Labs
2	9/2	Mon		**NO CLASS – Labor Day**
	9/4	Wed	Sanchez and Sullivan	Overview of Epidemiology
	9/5	Thurs		Lab: Overview of Epidemiology
3	9/9	Mon	Sanchez	History, milestones and achievements of epidemiology
	9/11	Wed	Sanchez	Measures of Frequency & Standardization
	9/12	Thurs		Lab: Measures of Frequency
4	9/16	Mon	Sullivan	Statistical Inference & Sample Size
	9/18	Wed	Sullivan	Intro to Confounding
	9/19	Thurs		Lab: Statistics & Sample Size
5	9/23	Mon	Sanchez	Experimental Studies
	9/25	Wed	Sanchez	Overview of Observational Study Designs; Cohort Studies
	9/26	Thurs		Lab: Cohort Studies
6	9/30	Mon	Sanchez	Case-Control Studies: Design, Measures of Association, Controls & Matching
	10/2	Wed	Sanchez	Cross-Sectional Studies
	10/3	Thurs		Lab: Case-Control Studies; In-Lab Exercise: Matching
7	10/7	Mon	Sanchez	Review for Midterm
	10/9	Wed		**MIDTERM**
	10/10	Thurs		**NO CLASS – Fall Break**
8	10/14	Mon		**NO CLASS – Fall Break**
	10/16	Wed	Sullivan	Role and practical applications of descriptive epidemiology; surveillance
	10/17	Thurs		Lab: Epidemiology in the Media
9	10/21	Mon	Sullivan	Confounding
	10/23	Wed	Sullivan	Selection Bias
	10/24	Thurs		Lab: Confounding
10	10/28	Mon	Sullivan	Information Bias
	10/30	Wed	Sullivan	Validity & Reliability of Diagnostic & Screening Tests
	10/31	Thurs		Lab: Selection Bias & Information Bias
11	11/4	Mon	Sanchez and Sullivan	In-Class Activity: Study Design Quiz Bowl
	11/6	Wed	Lopman	Measures characterizing frequency and spread of disease in populations
	11/7	Thurs		Lab: Validity & Reliability of Diagnostic & Screening Tests
12	11/11	Mon	Sullivan	Interaction
	11/13	Wed	Sanchez and Sullivan	In-Class Activity: Study Design & Threats to Validity
	11/14	Thurs		Lab: Interaction
13	11/18	Mon	Sanchez	Data Analysis Considerations & Modeling (Linear, Logistic)
	11/20	Wed	Sullivan	Survival Analysis
	11/21	Thurs		Lab: Data Analysis Considerations & Measures of Public Health Impact
14	11/25	Mon		**NO CLASS – Thanksgiving Break**
	11/27	Wed		**NO CLASS – Thanksgiving Break**
	11/28	Thurs		**NO CLASS – Thanksgiving Break**
15	12/2	Mon	Sullivan	From Association to Causation and from Causation to Prevention
	12/4	Wed	Sanchez	Final Review
	12/5	Thurs		Lab: Review for Final
16	12/9	Mon		**FINAL EXAM (in class, 3-4:50pm)**