



EMORY

ROLLINS  
SCHOOL OF  
PUBLIC  
HEALTH

DEPARTMENT: EPI

COURSE NUMBER: 560

SECTION NUMBER: 1

CREDIT HOURS: 4

SEMESTER: Spring 2022

COURSE TITLE: Epidemiologic Methods 4

CLASS HOURS AND LOCATION: Tu 10:00AM - 11:20AM; Fr 8:30AM - 9:50AM; Grace Crum Rollins RAR

INSTRUCTOR NAME: Ashley Naimi

#### INSTRUCTOR CONTACT INFORMATION

EMAIL: ashley.naimi@emory.edu

PHONE: 404.712.8332

SCHOOL ADDRESS OR MAILBOX LOCATION: Department of Epidemiology Rollins School of Public Health Emory University 1518 Clifton Road Atlanta, GA 30322

OFFICE HOURS: By Request (email or slack message me)

#### Teaching Assistant(s):

Name	Email	Office Hours	Lab Time and Location
Leah Moubadder	Leah.m.moubadder@emory.edu	TBD	Th 5:30PM - 6:50PM, GCR 115
Ani Deshpande	aniruddha.deshpande@emory.edu	TBD	We 5:30PM - 6:50PM, CNR 1034

#### COURSE DESCRIPTION

This course covers epidemiologic concepts in further depth than previous methods courses and provides an overview of advanced topic in the analysis of epidemiologic data. The course builds on the concepts and tools introduced in other Epi methods courses early in the series. This is a required course for students in the MSPH Epidemiology program, usually taken during the second year. Pre-requisites: Epi methods I, Epi methods II and Epi methods III.

#### CONCENTRATION COMPETENCIES

- Formulate a research question and study aims.
- Differentiate/Appraise among the strengths, limitations, and differences and similarities of various study designs.
- Calculate and interpret basic design-specific measures of association and their standard errors.
- Differentiate among design-specific sources and types of systematic error.
- Utilize advanced statistical software/programming to conduct epidemiological analysis.
- Interpret/critique epidemiologic results in a causal framework.

#### COURSE LEARNING OBJECTIVES

- Integrate fundamental epidemiologic concepts related to disease occurrence and associations.
- Articulate fundamental concepts in the potential outcomes frameworks.
- Understand the relation between exchangeability and bias.
- Understand and articulate the differences between truncation and censoring.
- Understand and recognize when and how to use regression models in various epidemiologic settings.
- Recognize the presence, impact, and ways to analyse competing risk data.
- Recognize and address the complications that arise from complex longitudinal (i.e., time-dependent exposures and confounders) data.
- Analyze time-fixed and longitudinal data using different analytical strategies.
- Understand bootstrap and its potential applications to the analysis of epidemiologic data.
- Correctly interpret p values and confidence intervals.

## EVALUATION

Basis of Final Grade	
Section Assignments	40%
Analysis Project	30%
Final Exam	30%

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

\* rounded to the nearest whole number

## COURSE STRUCTURE

The course includes two weekly lectures and one lab. The course will be divided into five sections, in which we will cover basic concepts in survival analysis (section 1), causal inference (section 2), regression modeling (section 3), time-dependent data (section 4), and variance and variance function estimation and interpretation. The lecture material is reinforced by section laboratory assignments which will be mix of short answer, long answer, multiple choice, and/or analysis questions. The laboratory assignments will seek to reinforce concepts through actual analysis. One take-home analysis project, and one take home final exam will evaluate understanding of the concepts being discussed in the lectures.

MPH/MSPH Concentration Competency	Representative Assessment
Formulate a research question and study aims	Section 1 and 2 Lab Activities Final exam
Appraise the strengths, limitations, and differences and similarities of various study designs with respect to given research questions	Section 1 and 2 Lab Activities Final Exam
Utilize advanced statistical software / programming to conduct epidemiological analysis.	All Section Lab Activities Analysis Project Final Exam
Interpret/critique epidemiologic results in a causal framework	Section 2 Lab Activity

## COURSE POLICIES

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### Text Readings

- Lecture notes.

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

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### 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](mailto: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](http://www.sph.emory.edu/cms/current_students/enrollment_services/honor_code.html))

## TENTATIVE COURSE CALENDAR & OUTLINE

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Lecture weeks: Jan 10, 2022 to April 25, 2022

- **Week 1, 2, (3):** Cohorts and Survival: Cohort and Timescale, Censoring and Truncation, Risk Functions, Kaplan-Meier Estimator, Competing Risks.
- **Week (3), 4, 5, 6:** Causal Inference: Correlation and Causation; Introduction to Causal Inference; Potential Outcomes; Estimand, Estimator, Estimate; Identifiability.

- **Week 7, 8:** Regression Modeling: Standard and Survival Regression, Marginal versus Conditional Models, Distributions and Link Functions, Marginal Standardization.
- **Week 9:** Spring Break (March 7 – 11)
- **Week 10, 11, 12, (13):** Time-Varying Data & g Methods: Longitudinal Data, Complex Longitudinal Data, Time Varying Confounding, Inverse Probability Weighting, G Computation, G Estimation of SNMMs.
- **Week (13), 14, 15:** Variance (standard error) estimation, Bootstrapping, p Values, and Confidence Intervals.
- **Week 16+:** Review, Q&A, and plans for the future!

Section Assignment Due Dates (Tentative):

- Section 1, Friday Jan 28
- Section 2, Friday Feb 18
- Section 3, Friday March 4
- Section 4, Friday April 1
- Section 5, Friday April 22