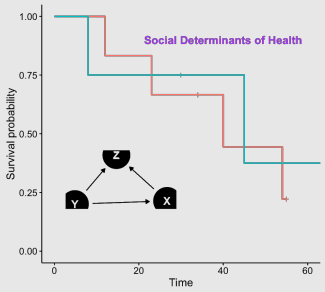
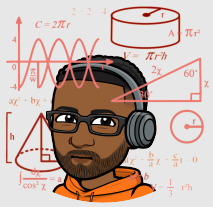


Measuring Health Disparities

Instructor Info



Reginald L. McGee II, Ph.D.

Pronouns: He/Him/His

Student Hours: Monday 4-5pm, Tues. 10am-12pm, Weds. 3-4pm, Fri. 2-3pm or by appt.

Hilles 209D

https://mcgeerb.sites.haverford.edu

rmcgee@haverford.edu

Course Info

Monday & Wednesday

1pm-2:25pm

Hilles 12

Equity and Inclusion

You are all welcome and belong here. I will always work to make our classroom a safe place for everyone to contribute, learn, and grow no matter your identity, background, or circumstances. Please do not hesitate to reach out if I can do anything to improve the classroom climate. In addition, I expect our classroom to be a place where we respect one another and support each other's learning.

Overview

Math H287 Statistical and mathematical tools for investigating disparities in health outcomes will be considered as well as the contexts in which they are applied. The course will begin with how to estimate disparities directly and using a linear model. Other aspects of statistical learning that will be considered include logistic regression and survival analysis. Additionally, we will talk about foundations of casual inference, in order to quantify and mitigate the effects of confounding variables. Homework and projects will be in RMarkdown and there will be an emphasis on presenting results clearly and in a reproducible fashion. Students will consider research articles and work towards replicating a quantitative result over the course of the semester. The prerequisites for the course are an introductory course in statistics and exposure to calculus. This course counts as a M-track elective for the Health Studies minor.

Learning objectives

- Demonstrate understanding of how and when to apply direct and model-based methods for estimating health disparities; as well as core concepts from logistic regression and survival analysis
- Demonstrate proficiency with interpreting and writing code in R/RMarkdown, and with accessing several public health data repositories
- Gain familiarity with social determinants of health (SDOH) and fundamental cause theory
- Develop an appreciation of best practices for computational reproducibility

Course materials

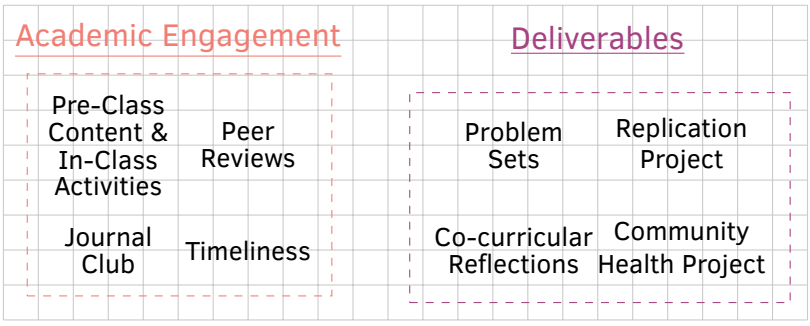
Rao, J. S. *Statistical Methods for Health Disparities (v. 1).* 2023.
https://www.taylorfrancis.com/books/mono/10.1201/9781003119449/statistical-methods-health-disparity-research-sunil-rao

James, G. *et al*. *An Introduction to Statistical Learning (v. 2).* 2023.
https://hastie.su.domains/ISLR2/ISLRv2_corrected_June_2023.pdf.download.html

Grading system overview

The course will follow a contract-based grading system [1] [2]. Contract-based grading is meant to improve transparency in grading, improve student agency and autonomy, and reduce overall anxiety. The components of the grading system are divided into academic engagement and deliverables, and are listed below.

After two weeks in the course, you will submit a memo on what grade you aim to earn. If you change your mind, you may resubmit a new memo at any time. If all of the conditions for your intended grade (see the task-achievement matrix on pg. 2) are not met, you will earn the applicable grade according to conditions met.



Wellness

- If you feel sick, do not come to class.
- For the safety of everyone, if you ever have an active cough please wear a mask over your nose and mouth during class and/or student hours. You will be asked to leave if you are noncompliant.

[1] https://wacclearinghouse.org/books/perspectives/labor/
[2] https://teaching.unl.edu/resources/alternative-grading/contract-grading/

Grading and assignment notes

"I don't care how much theory you got, if it don't have any practice applied to it, then that theory happens to be irrelevant. Right? Any theory you get, practice it." -Fred Hampton

Task-Achievement Matrix:

	A	A-	B+	B	B-	...
Pre- & In-Class Activities	Most+	Most	Some	Some	Few	None
Peer Reviews Completed	4	3	2	2	1	0
Journal Club	Actively engaged in most; leads a journal club	Actively engaged in most	Passively engaged in most	Present for most	Present for a few	Absent often or disruptive
Timeliness of submissions	Most on time	All within a week of due date	Most within a week	All submitted by deadlines	Missing deliverables	Missing most
Satisfactory Problem Sets	4+	4	3	2	1	0
Co-curricular Reflections	3, all distinct SDOH	3, with some duplicate SDOH	2, both distinct SDOH	2, duplicate SDOH	1	0
Course Projects	One exceeds, one meets expectations	Both meet expectations	Both submitted, one meets expectations	One meets expectations	One submitted	Neither submitted

The contract-based grading system for the course will be based upon the following components:

(i) Academic engagement includes effort observed throughout the course, contributing to a positive learning environment by asking questions and collaborating during in-class activities, completing pre-class activities, attending student hours, submitting peer reviews, engaging during Journal Clubs, answering questions, attending class, etc. You should aim to be doing many of these activities "most of the time" or "all of the time" as opposed to "some of the time" or "none of the time."

(ii) Problem sets consists of less routine problems, and are meant to challenge you to synthesize concepts and expose you to new aspects of the material. Problem sets will usually be due on Wednesdays at 4pm, with a due date of a week after, and ultimate submission deadline of two weeks from being assigned. There will be $\sim$5 problem sets and "satisfactory" will mean that the problem set is complete, clear, and any computations are reproducible.

NOTE: Problem sets will NOT be accepted beyond their deadline (two weeks from the assignment date). If you anticipate you may need to turn in your problem sets after the deadline you should arrange that ahead of time.

(iii) The replication project is a final product of the course, and this individual formative task will be scaffolded over most of the entire semester with a proposal, drafts, peer reviews, a final report, and either a reflection or a nondisposable component [3] (such as a blog or video). The project will require you to choose a research article on a topic of your interest, report on the methods and data sections of that paper, peer review a classmate's data section report, attempt to replicate results, concisely summarize the results and discuss any limitations/discrepancies and possible extensions. There will be opportunities to submit revised components as part of the final

(iv) The community health project is a final product of the course, and this summative task can be completed individually or as a group beginning in the last month of the semester. For this project you will submit a mock proposal to The Association of American Medical Colleges (AAMC) Collaborative for Health Equity: Act, Research, Generate Evidence (CHARGE). This will require you to review the 2026 AAMC CHARGE survey information, construct an analysis plan detailing which course methods you plan to apply, and submit a proposal according to the guidelines in the call for proposals.

NOTE: Project components will be assessed a scale of "meets expectations" (M; baseline; 3); "exceeds expectations" (E; outstanding work; 4); or "did not yet meet expectations" (N; didn't follow instructions/has major errors and needs revision; 0-1). To determine the final assessment of a project, the individual components will be aggregated and averaged and simple rounding will be applied.

[3] https://journals.sagepub.com/doi/10.1177/1475725718811711

Grading and assignment notes continued

"The test of a good teacher is not how many questions he can ask his pupils that they will readily answer, but how many questions he inspires them to ask him which he finds it hard to answer." -Alice Wellington Rollins

(vi) Co-curricular experiences are meant to complement our course material by engaging with health and health disparities from an angle other than mathematics and statistics, promote integrative thinking, and possibly spark considerations for your projects. You should submit reflections on each of your co-curricular experiences and you should verify attendance by sign-in or selfie. In your reflection, please summarize the activity, and discuss which social determinant of health it pertains to, how it connects to your academic interests, post-graduation interests, and/or our course. The reflection should are due a week after the event and have a final deadline of two weeks past the event. If you find another event or media that relates to health studies, social determinants of health, and/or health/environmental justice, you are welcome to submit it as a possible experience. For events, please submit them ahead of the event for approval and so that I can also let your classmates know it is an option.

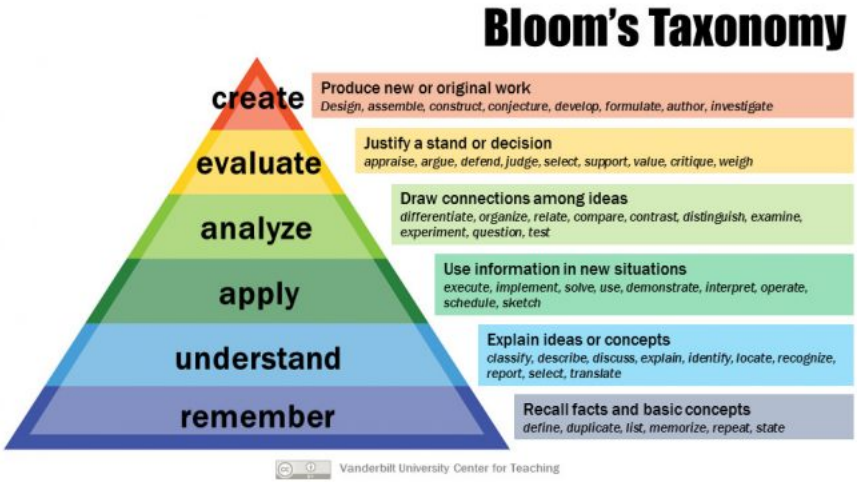
(vii) Submissions should be uploaded to Moodle/Gradescope in Portable Document Format (PDF) and the filename for the PDF document should be:
LASTNAME-FIRSTNAME-YEAR-MATH287-ASSIGNMENTNAME
These filename guidelines are in part to build good submission habits for when you need to send documents for jobs, interviews, internships, etc.

When life happens

Life happens to all of us, and it is important to recognize each other's humanity. Moreover, it is important to emphasize that your health and well-being are the most important outcomes of this class. The grace period on submissions is an example of a support built-in to the course for exactly when life happens. In general, please be in touch if there is anything that prevents you from engaging in the course and/or completing an assignment or assessment. The more advance notice helps the amount of options that can be considered. If there is an ongoing situation in your life, please let me and your Advising Dean know as soon as possible so that we can try to accommodate and make an optimal plan forward.

How to do well in this course

- Attend class, participate, and ask questions. Having questions means that you are processing the material, never hesitate to ask questions.
- Go over your lecture notes as soon after class as possible. Google Ebbinghaus forgetting curve for more on why.
- Start working on problem sets as soon as they are assigned.
- Visit student hours, even if you don't have questions it's good to simply discuss material.
- Read and work through the textbook and previous notes in preparation for class.
- Study topics iteratively and work towards developing a growth mindset.
- The MQC is place you can go to discuss problem sets with your classmates and ask questions of upperclass student tutors.



Class Schedule

MODULE 1: Direct Disparity Estimation

Timing	Topic	Readings
Week 1	Social determinants of health, Studies, Odds	Rao 1.1-1.4
	Studies, Odds, & Logical variables	
Week 2	Introduction to *R*, Logical arrays, & Subsetting	ISLR 2.3
Week 3	Accessing WHO Health Inequality Database & Dimensions of Inequality	
	Concentration curves: Foundations	Rao 2.2.2
Week 4	Computing concentration indices	Rao 2.2.2
	Indices of inequality: Foundations; Computations	Rao 2.2.2
Week 5	Nonordered measures	Rao 2.2.2
	Methodological issues	Keppel 2005

MODULE 2: Model-based Disparity Estimation

Week 7	National Health and Nutrition Examination Survey	
	Complex study designs	Li 2018
	Fundamental causes	Clouston 2021
Week 8	Regression and Visualization	ISLR 3, Rao 1.6
	Logistic Regression	ISLR 4.3
Week 9	Model-based measures of disparity	Rao 2.3 and 2.4.1
	Peter-Belson method	Rao 2.4.2
Week 10	Propensity score matching	Rao 4.3.2.3
	Causal considerations	McGowan 2024

MODULE 3: Survival Analysis

Week 11	Kaplan-Meier estimation	ISLR 11.3, Rao 2.7.5
	Implementing Kaplan-Meier & the Log rank test	ISLR 11.4, Rao 2.7.5
Week 12	Journal Club & Project Time	
Week 13	Calculus and Probability Review	ISLR 11.5, Rao 2.7.1
	Cox proportional hazard models	ISLR 11.5, Rao 2.7.6,
Weeks 14 & 15	Journal Clubs	

Collaboration

Collaboration on problem sets is welcomed, but should be approached carefully. There is a fine balance between learning from working with your fellow students and finding your own way through the material. What you turn in for written problem sets should reflect your personal understanding of the problems, so you must write the solutions yourself without referring to notes from your collaborative work. If you find you are not able to do this, then that is likely a sign that you have not yet fully understood that particular problem and you should pause and seek advice from us or one of the other help resources. Please indicate on your assignment who your collaborators were.

So as to ensure productive collaborative work, you should not be working in groups larger than four people on any given problem at any given time. Two- or three-person groups are better than four. Large groups of people "working together" are not really working together. If at any time in the semester you want to be working in a group but do not have a group of students to work with, please let us know and we will help you find a working group. If at any time in the semester, you find yourself in a group of students in which people are not feeling respected, please let me know as well.

Note that you are not allowed to use materials aside from the text, materials from Moodle, reserves in the library, and, of course, class notes in this course. These materials have been carefully curated to help you learn. In particular, do not use resources from the internet without express permission. Please help us ensure that we can maintain an environment of trust and respect throughout the semester by working with integrity and coming by if you have any questions.

NOTE: Out of class meetings for group assignments should be held in public spaces on campus and not in any student's dorm or residence.

The Internet

You're welcome to use internet sources for minor assistance with code if it is effectively documented just as you would with a collaborator. You shouldn't be solving entire portions of coursework with AI, search engines, and the like. If you're ever feeling the need to use internet sources beyond minor assistance or have a question about what constitutes minor assistance, please reach out so that I can support you in a way that will best promote your long term understanding of the material and will be in compliance with the College Honor code.

E-mail Policy

I will only respond to class-related emails from your "haverford.edu" or "brynmawr.edu" address. In the subject line of your email, you helps to include the name or number of the course so that I know to respond in an appropriate timeframe. Please begin with a salutation and also identify yourself in your email, and do not send attachments without first discussing it with me. It is sufficient to send the attachment in a separate email after describing it in a prior email. Emails that do not follow basic email etiquette may be ignored.

Disclaimer

The schedule listed on the course calendar is tentative, and topics covered on a given day may change slightly depending on the pace set for the course. The following may be changed, but only in the event of an emergency such as school closure: due dates for problem sets, dates for exams, and topics covered on each exam. If this occurs, it will be announced as soon as possible electronically and in class. I reserve the right to correct typographical errors on this syllabus without comment.

Equal Access

ADS: We are committed to partnering with you on your academic and intellectual journey and recognize that you bring many strengths, perspectives and strategies as you navigate this journey. We encourage you to think proactively and strategically about leveraging these strengths, in partnership with the many resources on campus. These resources include CAPS (free and unlimited counseling is available), Office of Academic Resources, Writing Center, Student Diversity Equity and Access Team, Health Services, Professional Health Advocate, Religious and Spiritual Life, the GRASE Center, and the Advising Deans. At times you may experience challenges or stressors that impact your ability to fully engage intellectually. If the stressors are academic, we welcome the opportunity to discuss and address those stressors with you in order to find solutions together. If you are experiencing challenges or questions related to emotional health, finances, physical health, relationships, learning strategies or differences, or other related topics, we hope you will consider reaching out to the many resources here on campus. Additional information can be found at `https://www.haverford.edu/deans-office-student-life/offices-resources`.

Additionally, Haverford College is committed to creating a learning environment that meets the needs of its diverse student body and provides equitable access to students with disabilities. If you have (or think you may have) a disability related to mental health, chronic health, neurological state, and/or physical condition – please contact the Office of Access and Disability Services (ADS) at hc-ads@haverford.edu. It is never too late to request ADA accommodations – our bodies and circumstances are continuously changing. Please know that all inquiries and health-related information is handled in a sensitive and confidential manner.

Students who have already been approved to receive academic ADA accommodations and want to use these in this course should share their accommodation letter and make arrangements to meet with us as soon as possible to discuss how their accommodations will be implemented in this course. Please note that accommodations are not retroactive and require advance notice in order to successfully implement.

If, at any point in the semester, a disability or personal circumstances affect your learning in this course, please do not hesitate to reach out to us. We want to be sure you are aware of the full range of resources and options available to you.

It is a state law in Pennsylvania that individuals must be given advance notice that they may be recorded. Therefore, any student who has a disability-related need to audio record this class must first be approved for this ADA accommodation by Access and Disability Services and then must communicate approval to me. I will then make a general announcement to the class that audio recording may occur while respecting students' right to privacy by not identifying the individual(s).

Title IX: Haverford College is committed to fostering a safe and inclusive living and learning environment where all can feel secure and free from harassment. All forms of sexual misconduct, including sexual assault, sexual harassment, stalking, domestic violence, and dating violence are violations of Haverford's policies, whether they occur on or off campus. Haverford faculty are committed to helping to create a safe learning environment for all students and for the College community as a whole. If you have experienced any form of gender or sex-based discrimination, harassment, or violence, know that help and support are available. Staff members are trained to support students in navigating campus life, accessing health and counseling services, providing academic and housing accommodations, and more.

The College strongly encourages all students to report any incidents of sexual misconduct. Please be aware that all Haverford employees (other than those designated as confidential resources such as counselors, clergy, and healthcare providers) are required to report information about such discrimination and harassment to the Bi-College Title IX Coordinator: `https://www.haverford.edu/users/ktaylor4`

Information about the College's Sexual Misconduct policy, reporting options, and a list of campus and local resources can be found on the College's website: `https://www.haverford.edu/sexual-misconduct`