

**EPID 710, FUNDAMENTALS OF EPIDEMIOLOGY Fall 2021 and
EPID 712, READINGS IN FUNDAMENTALS OF EPIDEMIOLOGY Fall 2021 (combined syllabus)**

EPID 710 Class time	T Th 9.30-10.45	MHRC 0001
EPID 712 Class times	601, 602: M 10.10 – 12.00	(GB, YZ) locations TBD
	603, 604: M 1.25 – 3.15	(KP, HJ) locations TBD

	Name	Email	Pronouns	Office hours‡
Instructor	Daniel Westreich	djw@unc.edu	he, him	Th 11.00 – 12.00
TAs	Griffin Bell	bell@unc.edu	he, him	Tu 11.00 – 12.00
	Hanna Jardel	jahan1@live.unc.edu	she/they	Th 11.00 – 12.00
	Kennedy Marie Peter	kpeter2@live.unc.edu	she, her	Tu 1.30 – 2.30
	Yitian Zhang	yitian@live.unc.edu	she, her	M 12.30 – 1.30

‡Office hours starting August 17, also by appointment; Zoom addresses to be posted on Sakai

Pandemic Let’s all just do our best, okay? Things are really difficult right now in many ways. Some of you are experiencing primary or secondary trauma; some of you (or your loved ones) may get sick during this semester; many of you just moved here and are feeling isolated and cut off. We’re all just going to do our best to support each other and get through it together. Come talk to me if you need to. **You got this.**

Masks This semester, while we are in the midst of a global pandemic, all enrolled students are required to wear a mask covering your mouth and nose at all times in our classroom. This requirement is to protect our educational community — your classmates and me – as we learn together. If you choose not to wear a mask, or wear it improperly, I will ask you to leave immediately, and I will submit a report to the [Office of Student Conduct](#). At that point you will be disenrolled from this course for the protection of our educational community. Students who have an authorized accommodation from Accessibility Resources and Service have an exception. For additional information, see [Carolina Together](#).

University Academic calendar: <https://registrar.unc.edu/wp-content/uploads/sites/9/2021/02/Chancellor-Calendar-AY21-22.pdf>
Final exam schedule: when it is up, find it at <https://registrar.unc.edu/academic-calendar/>.

Inclusion We strive to create an inclusive and welcoming classroom setting for students of all races, ethnicities, sexes, genders, sexual orientations, religions, physical ability/disability, and neuro-typical/atypical status. If you are experiencing harassment, or feel unwelcome in the classroom environment, please feel free to talk to the Instructor or a TA; we can also direct you to additional resources. Please feel welcome to email the Instructor and TAs with your pronouns and/or name.

Students who require additional accommodations for testing due to differing abilities, please contact the Accessibility Resources & Service office (<https://accessibility.unc.edu/>); you are welcome to talk to the Instructor about this as well, though the Accessibility office can do that communication for you.

Lectures in EPID 710 touch on race, sex/gender, sexual orientation, gender identity, and other issues. As such, the Instructor – Daniel Westreich – wants to say clearly: as a cis, white man, I am likely to make some mistakes in talking about race, sex, gender, and sexuality (and intersections thereof) at some point in the semester. I hope that when I do, you feel empowered to give me feedback on what didn't work for you, and how I can do better – in person or on paper, with your name attached or anonymously. It is not your job to educate me, but if you choose to, I promise I will do my very best to receive all such feedback with an open mind and gratitude, and as little defensiveness as I can muster. The Teaching Assistants echo these sentiments and strongly encourage feedback so that, together, we can create a welcoming, inclusive, growth-focused environment for all.

Honor code	Academic integrity is at the heart of Carolina and moreover at the heart of the scientific enterprise. We all are responsible for upholding the ideals of honor and integrity. The student-led Honor System is responsible for adjudicating any suspected violations of the Honor Code and all suspected instances of academic dishonesty will be reported to the honor system. Information, including your responsibilities as a student is outlined in the Instrument of Student Judicial Governance. Your full participation and observance of the Honor Code is expected. If you have any questions about this issue, you may talk with the Instructors or a TA. (Most language directly from http://studentconduct.unc.edu/faculty/honor-syllabus).
Title IX resources	Any student who is impacted by discrimination, harassment, interpersonal (relationship) violence, sexual violence, sexual exploitation, or stalking is encouraged to seek resources on campus or in the community. Reports can be made online to the EOC at https://eoc.unc.edu/report-an-incident/ . Please contact the University’s Title IX Coordinator (Elizabeth Hall, interim – titleixcoordinator@unc.edu), Report and Response Coordinators in the Equal Opportunity and Compliance Office (reportandresponse@unc.edu), Counseling and Psychological Services (confidential), or the Gender Violence Services Coordinators (gvsc@unc.edu ; confidential) to discuss your specific needs. Additional resources are available at safe.unc.edu .
Syllabus changes	The professor reserves the right to make changes to the syllabus, including project due dates and test dates. These changes will be announced as early as possible.
Accessibility Resources and Services	The University of North Carolina at Chapel Hill facilitates the implementation of reasonable accommodations, including resources and services, for students with disabilities, chronic medical conditions, a temporary disability or pregnancy complications resulting in barriers to fully accessing University courses, programs and activities. Accommodations are determined through the Office of Accessibility Resources and Service (ARS) for individuals with documented qualifying disabilities in accordance with applicable state and federal laws. See the ARS Website for contact information: https://ars.unc.edu or email ars@unc.edu .
Counseling & Psychological Services	CAPS is strongly committed to addressing the mental health needs of a diverse student body through timely access to consultation and connection to clinically appropriate services, whether for short or long-term needs. Go to their website: https://caps.unc.edu/ or visit their facilities on the third floor of the Campus Health Services building for a walk-in evaluation to learn more.

NOTES SPECIFIC TO EPID 710 ONLY

Schedule of lectures and exercises

Date	Subject	Subtopics	Exercises
19 Aug	Epidemiology & Society	Asking good questions; "You are they."	
24 Aug	Measures of occurrence	Prevalence, incidence	
26 Aug	Measures of association	Differences, ratios, attributable proportions, 2x2 tables	
31 Aug	Causal inference	Potential outcomes; exposure/intervention; Identifiability assumptions. Causal diagrams. Systematic & random error	Exercise 1 out
2 Sep	Causal inference		
7 Sep	Racism & disparities	Structural racism & health; what are "race", "sex", "gender", "SES"? Fundamentals of social epidemiology	Exercise 1 due
9 Sep	Racism & disparities		
14 Sep	Randomized trials 1	Overview; mechanics; causal inference principles	
16 Sep	Randomized trials 2	Basic data analysis; how biases arise	Exercise 2 out
21 Sep	Randomized trials 3	Issues: factorial trials, subgroups; generalizability; ...	
23 Sep	Randomized trials 4	Real-world examples – video lecture	Exercise 2 due
28 Sep	Observational cohorts 1	Overview; mechanics; causal inference principles	
30 Sep	Observational cohorts 2	Basic data analysis; how biases arise	Exercise 3 out
5 Oct	Observational cohorts 3	Additional issues: interaction, effect modification; ...	
7 Oct	Observational cohorts 4	Real-world examples – video lecture	Exercise 3 due
12 Oct	<i>UNIVERSITY DAY</i>		
14 Oct	Regression modeling	An intuitive introduction to regression modeling	
19 Oct	MIDTERM		
21 Oct	<i>FALL BREAK</i>		
26 Oct	Case-control 1	Overview; mechanics; causal inference principles	
28 Oct	Case-control 2	Basic data analysis; how biases arise	Exercise 4 out
2 Nov	Case-control 3	Additional issues, including Berkson's bias	
4 Nov	Case-control 4	Real-world examples – video lecture	Exercise 4 due
9 Nov	Surveillance/screening 1	Surveillance	
11 Nov	Surveillance/screening 2	Diagnostic testing and screening	Exercise 5 out
16 Nov	Surveillance/screening 3	Measurement error and sensitivity analysis	
18 Nov	Surveillance/screening 4	Real-world examples – video lecture	Exercise 5 due
23 Nov	Quasi-experiments	Quasi-experimental studies	
	+ Infectious diseases	An introduction to epidemic modeling – video lecture	
25 Nov	<i>THANKSGIVING</i>		
30 Nov	Capstone	Challenging the hierarchy of study designs	
	FINAL EXAM		
		TAKE HOME (PROBABLY)	

EPID 710	Fundamentals of Epidemiology. 3 Credits. An intensive introduction to epidemiological concepts and methods from a perspective of causal inference. This course is for students intending to lead, engage in, collaborate in, or interpret the results of epidemiologic studies. Some familiarity with biomedical concepts may be needed. Three lecture hours a week.
Learning outcomes	Students will learn the basics of epidemiologic study designs (including randomized trials, observational cohort studies, and case-control studies), the fundamentals of study conduct and analysis, and concepts related to public health surveillance and screening. Students completing this course will be well-prepared for further study in epidemiology.
Grading	Grades are based on three components: five take-home exercises (40% of final grade); mid-term exam (24% of final grade); final exam (36% of final grade). High pass will be given for final grade of 90.0 and above; pass for 89.9 - 70.0; low pass for 69.9 - 60.0; fail for <60.0.
Exercises	The five exercises are to be completed independently, without help from any other students . Late policy: 50% of your final score is deducted for each day late. If you have a scheduling conflict which will prevent you from completing or turning in the assignment on time, talk to the Instructor one week before the assignment is due. Reasonable exceptions will be made for sicknesses and emergencies.
Exams	The plan (just before the semester starts) is that the mid-term and final exam will both be take-home exams, time/dates TBA (have not been posted yet to my knowledge, but will be posted eventually at https://registrar.unc.edu/academic-calendar/). You are not permitted to access any previous midterm or final exams for this class, subject to the Honor Code. You also must keep your exams and exam answers confidential except for members of your own class; we reuse questions year-to-year, so sharing these with (for example) next year's students will violate the Honor Code and (see below) also make enormous additional work for us. Please don't!
Disclosure	Daniel Westreich is the author of the required text. A copy of the text is available in the UNC Davis Library.
Readings	See next page, but critically: readings should be completed before the class with which they are associated.
Attendance & participation.	Attendance and participation are both expected and strongly encouraged.

READINGS FOR EPID 710

Date	Subject	Main Reading	Supplemental reading
19 Aug	Epidemiology & Society	EBD Overview P0	RO Ch 1-2
24 Aug	Measures of occurrence	EBD Ch 1	RO Ch 4
26 Aug	Measures of association	EBD Ch 2 HR Ch 1	
31 Aug	Causal inference	EBD Ch 3 (3.1-3.4) HR Ch 3	P2 HR Ch 6
2 Sep	Causal inference	EBD Ch 3 (3.5-3.8) P1	RO Ch 3 EBD Ch 3 Appendix
7 Sep	Racism and health disparities	P7, P8, P9, P10	
14 Sep	Randomized trials (wk 1)	EBD Ch 5 (5.1-5.3) HR Ch 2	HR Ch 4, 5, 10 RO Ch 8, 9, 11
21 Sep	Randomized trials (wk 2)	EBD Ch 5 (5.4-5.8)	
28 Sep	Observational cohorts (wk 1)	EBD Ch 6 (6.1 – 6.3) HR Ch 7	HR Ch 3 (review) RO pp 69-87; pp 136-145; Ch 10
5 Oct	Observational cohorts (wk 2)	EBD Ch 6 (6.4 – 6.8)	
14 Oct	Regression analysis		RO Ch 12 P5
26 Oct	Case-control (wk 1)	EBD Ch 7 (7.1-7.4) HR Ch 8	P3 P4
2 Nov	Case-control (wk 2)	EBD Ch 7 (7.5-7.7)	RO pp 87-107, 126-133
9 Nov	Surveillance/screening (wk 1)	EBD Ch 4	HR Ch 9
16 Nov	Surveillance/screening (wk 2)	TBD	P6
23 Nov	Quasi-experiments, Infectious diseases	EBD Ch 8	RO Ch 6
30 Nov	Capstone	EBD Ch 9	

Readings are listed above by date/lecture. The codes correspond to the following:

(EBD) Westreich D. Epidemiology By Design. Oxford University Press, New York, NY, 2019.

(HR) Hernán MA, Robins JM. Causal Inference: What If. Free, www.hsph.harvard.edu/miguel-hernan/causal-inference-book

(RO) Rothman KJ. Epidemiology: An introduction. 2nd edition. Oxford University Press, NY, NY, 2012.

(P0) Rose G. Sick individuals and sick populations. *International Journal of Epidemiology*, 1985;14:32-38. (reprinted in 2001).

(P1) Maldonado G, Greenland SG. Estimating causal effects. *International Journal of Epidemiology*, 2002 Apr; 31,2.

(P2) Rothman KJ, Greenland SG. Causation and causal inference in epidemiology. *Am J Pub Health*, 2005; 95(S1): S144-S150.

(P3) Wacholder S. Design issues in case-control studies. *Stat Methods in Med Research*, 1995; 4: 293-309.

(P4) Westreich D. Berkson's bias, selection bias, and missing data. *Epidemiology*, 2012; 23(1): 159-164.

(P5) Westreich D, Greenland S. The table 2 fallacy.... *American Journal of Epidemiology*, 2013 Feb 15;177(4):292-8.

(P6) Miller WC, et al. Prevalence of Chlamydial and Gonococcal Infections.... *JAMA*, 2004;291(18):2229-2236.

(P7) Bailey ZD, et al. Structural racism and health inequities in the USA: evidence and interventions. *Lancet* 2017; 389: 1453–63.

(P8) VanderWeele T, Robinson W. On the Causal Interpretation of Race in Regressions Adjusting for Confounding and Mediating Variables. *Epidemiology*. Volume 25, Number 4, July 2014

(P9) Kaufman JS. Race: Ritual, Regression, and Reality. *Epidemiology*. Volume 25, Number 4, July 2014

(P10) Ward JB, et al. How do we assess a racial disparity in health? Distribution, interaction, and interpretation in epidemiological studies. *Annals of Epidemiology*. 2018.

So, "HR Ch 9" means Hernán & Robins, Causal Inference, Chapter 9. **Note that all readings from (RO) are entirely optional.**

NOTES SPECIFIC TO EPID 712 ONLY

EPID 712 Readings in Fundamentals of Epidemiology. 2 Credits.

A course applying the concepts and methods introduced in EPID 710 (required co-requisite for EPID 712) to readings in the epidemiologic, biomedical, and public health research literature.

Learning Students will go deeper into the basics of epidemiologic study designs and methods. Students completing this course will be well-prepared for further doctoral-level study in epidemiology.

Overview EPID 712 meets in four sections, which take place on Mondays, 10.10 – 12.00 and 1.25 – 3.15, and which are directly taught by TAs for EPID 710.

Attendance & participation Attendance is required without prior authorization from your Lab Instructor. Participation is expected and strongly encouraged.

Assignments Lab answers must be completed before class: you are required to email your answers to lab questions to your Lab Instructor by 10am the Monday of that lab session. (That is, Lab 2 is due at 10am the Monday of Lab 2 sessions – *regardless of what lab section you are in*). There is no need to send in Lab 1 before your lab period.

You may work in groups and consult whatever guides you like to complete the labs; however, your words must be your own (do not copy answers word-for-word from each other).

Labs will typically be posted at least one week in advance.

Grading Lab grade will be determined as follows: **75%** of lab grade is based on the completed labs you send to your Lab Instructor. We will randomly select one question from each lab to grade as pass/fail. We will grade for effort, not for accuracy: making a valiant attempt at answering a question will get full points, even if your answer is entirely wrong. The remaining **25%** of lab grade is based on your co-leading at least one lab. Your Lab Instructor will discuss leading lab sections with you during your first lab session.

Schedule Note that this course is a readings and discussion course; attendance is required.

Date	Subject	TOPIC
23 Aug	LAB 1	Measures of occurrence
30 Aug	LAB 2	Causality
6 Sep	LABOR DAY	
13 Sep	LAB 3	Racism and disparities
20 Sep	LAB 4	Randomized trials
27 Sep	LAB 5	Factorial designs and subgroup analysis
4 Oct	LAB 6	Observational cohort studies
11 Oct	LAB 7	Confounding
18 Oct	NO CLASS	
25	LAB 8	Case-control studies
1 Nov	LAB 9	Case-control analysis and selection bias
8 Nov	LAB 10	Surveillance
15 Nov	LAB 11	Information bias
22 Nov	LAB 12	Study theory and meta-analysis
29 Nov	NO CLASS	

Note Labs 1-2 are on material not yet covered in lecture, while subsequent Labs are on material **already covered in lecture**. The reason for this is, basically, Labor Day and where it falls; but in any case, we expect that labs 1-2 may present slightly different challenges than subsequent labs for this reason.