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**University of Florida**  
**College of Public Health & Health Professions Syllabus**  
**PHC 6011: Epidemiology Methods II (3 credit hours)**  
Summer A/C 2015  
Delivery Format: On-Campus (HPNP G-201), MW 12:30–4:45  
Canvas Course Website: <https://lss.at.ufl.edu/>

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### **Instructor Information**

Travis Gerke, ScD  
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Teaching Assistant: Diana Rojas Alvarez ([dprojas@epi.ufl.edu](mailto:dprojas@epi.ufl.edu))  
Preferred course communications: Email, office hours

### **Prerequisites**

PHC 6000, PHC 6052, and PHC 6053. Admission may be restricted to epidemiology concentration students, with others admitted as space is available. Students are required to have applied SAS or R in their regression course, preferably in PHC 6053. Students must have access to a laptop with either SAS version 9.2 or higher or R version 3.1.0 or higher for in-class use. This class assumes an advanced competency with epidemiologic principles and vocabulary, in addition to a working knowledge of introductory statistical inference and regression techniques.

### **Purpose and Outcome**

*Course Overview.* This course describes the implementation of common analytic methods in epidemiology. A course project helps build a foundation in applied epidemiologic analysis and develop experience in peer-review productivity based on secondary data.

*Course Objectives.* This course builds upon PHC 6000 (Epidemiology Methods I) to extend the understanding of epidemiologic concepts and methods by providing applied training in the conduct of secondary data analysis studies. Using data from the National Longitudinal Study of Adolescent to Adult Health (Add Health), students will identify a research question; define a causal model, specific aims, and hypotheses based on a review of the literature; gain experience in data management; conduct epidemiologically sound analyses with regard to study design, confounding, and effect modification; and interpret results with respect to the strength and precision of estimates, potential selection and information bias, measured and unmeasured confounding, and generalizability.

*Instructional Methods.* We will meet for 11 sessions, each of which will last 4.25 hours. In general, sessions will consist of two parts: theory and application. The theory components will introduce epidemiologic methods and provide a brief discussion of their statistical underpinnings. In the application sections, we will explore how the methods are implemented and interpreted in practice using SAS and R. Application sections will also include student presentations at key milestones in the course project. Upon completion of the course project, students will have generated a research question, compiled and analyzed data to address this question, and constructed a manuscript draft that would be approximately suitable for peer-reviewed journal submission.

## Description of Course Content

### Course Schedule.

Date	Topics (● = theory section, ▷ = applied section)
Monday, May 11, 2015 12:30–4:45 pm	<ul style="list-style-type: none"><li>● Designing secondary data analysis studies</li><li>● Epidemiologic study designs</li><li>● Confounding, selection bias, and causal diagrams (DAGs)</li><li>▷ Overview of the Add Health data resource</li><li>▷ Select project teams</li><li>▷ Loading the Add Health data</li></ul>
Wednesday, May 13, 2015 12:30–4:45 pm	<ul style="list-style-type: none"><li>● Understanding your data, choosing a coding structure</li><li>● Table 1</li><li>▷ Tabling and visualizing data</li><li>▷ Recoding variables</li><li>▷ Work on conceptual model</li></ul>
Monday, May 18, 2015 12:30–4:45 pm	<ul style="list-style-type: none"><li>● Generalized linear models: normal, logistic, and Poisson regression</li><li>▷ GLMs in SAS and R</li></ul>
Wednesday, May 20, 2015 12:30–4:45 pm	<ul style="list-style-type: none"><li>● Time-to-event data</li><li>● Survival models</li><li>▷ Time-to-event analyses in SAS and R</li><li>▷ Oral presentations of project part 1</li></ul>
Wednesday, May 27, 2015 12:30–4:45 pm	<ul style="list-style-type: none"><li>● Interaction</li><li>● Mediation</li><li>▷ Interaction and mediation in SAS and R</li><li>▷ Written project part 1 due</li></ul>
Monday, June 1, 2015 12:30–4:45 pm	<ul style="list-style-type: none"><li>● Impact of confounders</li><li>● Measurement error and misclassification</li><li>● Sensitivity analyses</li><li>▷ Sensitivity analyses in SAS and R</li></ul>
Wednesday, June 3, 2015 12:30–4:45 pm	<ul style="list-style-type: none"><li>● Model and variable selection</li><li>● High-dimensional data</li><li>● Penalized regression</li><li>▷ Selection and penalized regression in SAS and R</li><li>▷ Oral presentations of project part 2</li></ul>
Monday, June 8, 2015 12:30–4:45 pm	<ul style="list-style-type: none"><li>● Missing data</li><li>▷ Methods for handling missing data in SAS and R</li><li>▷ Written project part 2 due</li></ul>
Wednesday, June 10, 2015 12:30–4:45 pm	<ul style="list-style-type: none"><li>● Clinical prediction models</li><li>● Discrimination and calibration</li><li>● Optimism and validation</li><li>▷ Prediction models in SAS and R</li></ul>
Monday, June 15, 2015 12:30–4:45 pm	<ul style="list-style-type: none"><li>● Project presentations and review</li><li>▷ Full written projects due</li></ul>
Wednesday, June 17, 2015 12:30–4:45 pm	<ul style="list-style-type: none"><li>● Project presentations and review</li></ul>

*Course Materials and Technology.* Throughout the course, we will analyze data from the National Longitudinal Study of Adolescent to Adult Health (Add Health). De-identified, publicly-accessible versions of this data are available through the ICPSR website ([www.icpsr.umich.edu](http://www.icpsr.umich.edu)). There are 4 waves of data, and each can be found by searching for the term “Add Health” within ICPSR.

In general, IRB considerations when analyzing health data are *very* important, and one must obtain IRB approval when conducting human subjects research. For the purposes of this course *only*, IRB approval for use of the Add Health data is not needed, since we are not conducting research (we are not contributing to generalizable knowledge, rather, we are simply completing course exercises). If, however, you wish to

present your findings anywhere outside this classroom, you will need to apply for an IRB exemption through <https://my.irb.ufl.edu>. Applying for an exemption from full IRB board review is easier and faster than asking for a full panel review; the reason your research will qualify for exempt status is that the data is anonymous and in the public domain. I would encourage all student teams to apply for IRB exemption for your research question, as this will permit maximum flexibility for presenting your findings. Indeed, I hope that everyone makes an important scientific discovery that they wish to share beyond the confines of our classroom!

For all class sessions, students are expected to bring a laptop with either SAS version 9.2 or higher or R version 3.1.0. In my own work, I find that SAS can be useful for managing and merging data resources, while R is far superior with respect to statistical analysis and visualization. As such, I will often prepare data in SAS, then export it for use in R. You are welcome to use whichever pipeline you feel will be most relevant to your own research; the course can successfully be completed entirely with SAS, entirely with R, or using some mixture of the two.

For technical support for this class (not related to SAS or R programming), please contact the UF Help Desk at: [Learning-support@ufl.edu](mailto:Learning-support@ufl.edu), (352) 392-HELP - select option 2, or <https://lss.at.ufl.edu/help.shtml>.

#### *Textbooks.*

- [Required] Woodward M. *Epidemiology: Study Design and Data Analysis*, Third Edition. Boca Raton, FL: CRC Press, 2013.
- [Recommended] Rothman K, Greenland S, and Lash T. *Modern Epidemiology*, Third Edition. Philadelphia, PA: Lippincott Williams & Wilkins, 2008.
- [Recommended] Agresti A. *An Introduction to Categorical Data Analysis*, Second Edition. Hoboken, NJ: Wiley, 2007.
- Additional article-length readings will be assigned from the scientific research literature as needed.

## **Academic Requirements and Grading**

The assessment is primarily based on assignments that guide students through conduct of their secondary data analysis studies (project parts 1–3). Most projects will use the Add Health data, although students are welcome to use their own data with instructor (and IRB) approval. Each project part consists of an oral presentation and a written component. The written components should include the code used to generate any results; this forms part of the grade for the written pieces. Students are also assessed on feedback provided to their peers and on short quizzes (typically 2 questions) that address primary themes from the previous session. Several topics covered in the course are not required to be used in the course project (e.g. survival analysis), and the quizzes are designed to assist in the learning of this material.

*Project Part 1.* This project component will present the conceptual model (in the form of a DAG) with an accompanying brief literature review. Because of time constraints in the course, the literature review need not be as extensive as is typical of peer-reviewed literature; however, some justification of the proposed study should be presented. Written aims and hypotheses should complement and describe the conceptual diagram. A data table that presents relevant population characteristics for your study is required. Maximum length: 2 double-spaced pages not including tables, figures, and references.

*Project Part 2.* This piece will summarize your multivariable results. You don't need to interpret them yet in the context of the larger literature; that task is for project part 3. For part 2, the idea is that you have carefully considered and tested your model assumptions and presented them in a clear fashion. Maximum length: 1 double-spaced page not including tables, figures, and references.

*Project Part 3.* In this component you will interpret your results in a discussion section and write the abstract for your study. In addition to stating how your findings complement or move the literature forward, please comment on reasonable next steps and study limitations. Maximum length: 2 double-spaced pages not including tables, figures, and references.

Requirement	Due date	Points
Focal point quizzes (8 quizzes, 2 grade points each)	Daily	16
Oral presentation of project part 1	May 20	10
Written project part 1: Introduction and table 1	May 27	17
Oral presentation of project part 2	June 3	10
Written project part 2: Analysis results (numerical)	June 8	17
Written project part 3: Discussion and abstract	June 15	17
Oral presentation of full project	June 15/17	10
Feedback on Peers' Presentations (4 reviews, 2 grade points each)	Presentation dates	8

Note that these components sum to 105. The possible point total is set at 100 points. This is done to help you in the event that you need to drop a focal point quiz or miss a section of student presentations as a result of unforeseen attendance issues.

#### *Point system.*

Points earned	93–100	90–92	87–89	83–86	80–82	77–79	73–76	70–72	67–69	63–66	60–62	< 60
Letter grade	A	A–	B+	B	B–	C+	C	C–	D+	D	D–	E
Grade points	4.0	3.67	3.33	3.0	2.67	2.33	2.0	1.67	1.33	1.0	0.67	0.0

For greater detail on the meaning of letter grades and university policies related to them, see the Registrar's Grade Policy regulations at: <http://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

*Policy related to class attendance.* Class attendance is mandatory. Excused absences follow the criteria of the UF Graduate Catalogue (e.g., illness, serious family emergency, military obligations, religious holidays), and should be communicated to the instructor prior to the missed class day when possible. UF rules require attendance during the first two course sessions. Missing more than two scheduled sessions (each session is about 4 hours of instruction) will result in a failure. Students are responsible for all material presented in class and meeting the scheduled due dates for class assignments.

### **Student Expectations, Roles, and Opportunities for Input**

*Expectations Regarding Course Behavior.* Please come to class on time and be prepared to stay until the time scheduled as the end of class. We think your investment in the degree is worth maximizing your in-class experience, and we expect to provide materials that utilize the full, scheduled class times. The use of cell phones is not permitted. Please turn them off or, if you expect urgent calls, set them to “vibrate.” Please do not engage in “side conversations” while the instructor or a presenter is leading the class. If the material is unclear, other students are likely to have a similar question; you are strongly encouraged to ask in-class questions so that all students may benefit from the discussion.

*Communication Guidelines.* Assistance with course material is available during scheduled office hours or by appointment. Emailed questions are also welcome, and we aim to address all such inquiries within 24 hours of receipt (or on Monday if the email was sent on Friday). Please do not re-send the same question until the appropriate time frame has elapsed (24 hours or end of day Monday for emails sent on Friday). Student success and understanding is of the utmost importance, so each email receives careful consideration. Because the number of students in the course is not small, substantial time may be spent by the instructor and TA on emailed concerns; your patience and understanding is appreciated. When emailing a question, please also copy the TA, as this may increase your chances of getting a quick reply!

*Academic Integrity.* Students are expected to act in accordance with the University of Florida policy on academic integrity. As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge:

“We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.”

You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied:

“On my honor, I have neither given nor received unauthorized aid in doing this assignment.”

It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For additional information regarding Academic Integrity, please see Student Conduct and Honor Code or the Graduate Student Website for additional details:

- <https://www.dso.ufl.edu/scsr/process/student-conduct-honor-code/>
- <http://gradschool.ufl.edu/students/introduction.html>

Please remember cheating, lying, misrepresentation, or plagiarism in any form is unacceptable and inexcusable behavior.

*Online Faculty Course Evaluation Process.* Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu>. Students will be given specific times when the evaluations can be made. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

It is very important to me that you are able to develop a set of epidemiologic tools in this course that you will find useful in your career. Naturally, the presentation of some tools may be stronger than others. Your feedback on this issue is extremely valuable to me; please feel free to comment on what strategies worked and which might be improved, as I will modify future versions of this course to leverage such knowledge of strengths and weaknesses. As an additional consideration, these evaluations are also useful at the University level, as they are examined in the context of faculty tenure and promotion procedures.

## Support Services

*Accommodations for Students with Disabilities.* If you require classroom accommodation because of a disability, you must register with the Dean of Students Office <http://www.dso.ufl.edu> within the first week of class. The Dean of Students Office will provide documentation of accommodations to you, which you must then give to me as the instructor of the course to receive accommodations. Please make sure you provide this letter to me by the end of the second week of the course. The College is committed to providing reasonable accommodations to assist students in their coursework.

*Counseling and Student Health.* Students sometimes experience stress from academic expectations and/or personal and interpersonal issues that may interfere with their academic performance. If you find yourself facing issues that have the potential to or are already negatively affecting your coursework, you are encouraged to talk with an instructor and/or seek help through University resources available to you.

- The Counseling and Wellness Center 352-392-1575 offers a variety of support services such as psychological assessment and intervention and assistance for math and test anxiety. Visit their web site for more information: <http://www.counseling.ufl.edu>. On line and in person assistance is available.
- You Matter We Care website: <http://www.unmatter.ufl.edu/>. If you are feeling overwhelmed or stressed, you can reach out for help through the You Matter We Care website, which is staffed by Dean of Students and Counseling Center personnel.
- The Student Health Care Center at Shands is a satellite clinic of the main Student Health Care Center located on Fletcher Drive on campus. Student Health at Shands offers a variety of clinical services. The clinic is located on the second floor of the Dental Tower in the Health Science Center. For more information, contact the clinic at 392-0627 or check out the web site at: <https://shcc.ufl.edu/>.

- Crisis intervention is always available 24/7 from: Alachua County Crisis Center, (352) 264-6789, <http://www.alachuacounty.us/DEPTS/CSS/CRISISCENTER/Pages/CrisisCenter.aspx>

Do not wait until you reach a crisis to come in and talk with us. We have helped many students through stressful situations impacting their academic performance. You are not alone so do not be afraid to ask for assistance.