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University of Florida
College of Public Health & Health Professions Syllabus
PHC 6711: Measurement in Epidemiology and Outcomes Research (3 credit hours)
Spring 2016
Delivery Format: On-Campus (HPNP G-110), F 9:35–12:35
Canvas Course Website: https://elearning.ufl.edu/

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Instructor Information

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Preferred course communications: Email, office hours

Prerequisites

PHC 6001 and PHC 6050, or instructor permission.

Purpose and Outcome

Course Overview. This course describes major designs and principles of measurement for epidemiology and health services outcomes research with an emphasis on primary data collection.

Course Objectives. This course focuses on principles of measurement in epidemiologic/health outcomes research studies. Students will read and review methodological articles from the public health literature, and discuss how the methods presented can be leveraged to improve study design. Special emphases include: causal inference, measures of occurrence and effect, attributable fractions, matched designs, instrumental variables, survey design, prediction model performance, biomarkers and molecular epidemiology, and whole exposome studies.

Instructional Methods. We will meet for 14 sessions, each of which will last 3 hours. Prior to each session, 2–3 readings will be assigned from the epidemiologic literature, and a review form will be completed by each student. Classes are discussion-based, and the goal of each session is to enable each student to understand the merits and limitations of specific methods with respect to primary study design. There are no exams, and grades will be based entirely on written article reviews and corresponding class participation.

Description of Course Content

Course Schedule.

Date	Agenda (● = topic, ▷ = required reading, † = optional reading)
Friday, January 8, 2016 9:35 am – 12:35 pm	● Course overview ● Study design review ● Causal diagrams (DAGs) ▷ Modern Epidemiology, pages 87–127. ▷ Greenland S, Pearl J, Robins JM. Causal diagrams for epidemiologic research. Epidemiology. 1999;10(1):37–48. PMID: 9888278.

Date	Agenda (• = topic, ▷ = required reading, † = optional reading)
Friday, January 15, 2016 9:35 am – 12:35 pm	• Measures of occurrence and effect ▷ Elandt-Johnson RC. Definition of rates: some remarks on their use and misuse. Am J Epidemiol. 1975;102(4):267–71. PMID: 1180251. ▷ Hernán MA. The hazards of hazard ratios. Epidemiology. 2010;21(1):13–5. PMID: 20010207. † Modern Epidemiology, pages 32–56.
Friday, January 22, 2016 9:35 am – 12:35 pm	• Misclassification and measurement error ▷ Modern Epidemiology, pages 137–147 ▷ Hernán MA, Cole SR. Invited Commentary: Causal diagrams and measurement bias. Am J Epidemiol. 2009;170(8):959-62. PMID: 19755635. † Vanderweele TJ, Hernán MA. Results on differential and dependent measurement error of the exposure and the outcome using signed directed acyclic graphs. Am J Epidemiol. 2012;175(12):1303-10. PMID: 22569106.
Friday, January 29, 2016 9:35 am – 12:35 pm	• Methods for measurement error correction ▷ Modern Epidemiology, pages 352–361 ▷ Thomas D, Stram D, Dwyer J. Exposure measurement error: influence on exposure-disease. Relationships and methods of correction. Annu Rev Public Health. 1993;14:69-93. PMID: 8323607.
Friday, February 5, 2016 9:35 am – 12:35 pm	• Designs that use matching ▷ Mansournia MA, Hernán MA, Greenland S. Matched designs and causal diagrams. Int J Epidemiol. 2013;42(3):860–9. PMID: 23918854. ▷ Modern Epidemiology, pages 171–182.
Friday, February 12, 2016 9:35 am – 12:35 pm	• Designs that use instrumental variables ▷ Greenland S. An introduction to instrumental variables for epidemiologists. Int J Epidemiol. 2000;29(4):722–9. PMID: 10922351 ▷ Hernán MA, Robins JM. Instruments for causal inference: an epidemiologist's dream? Epidemiology. 2006;17(4):360–72. PMID: 16755261. ▷ Modern Epidemiology, pages 202–204.
Friday, February 19, 2016 9:35 am – 12:35 pm	• Self-report surveys (Guest: Dr. Marv Krohn) ▷ Guest article selection(s) TBA ▷ Coughlin SS. Recall bias in epidemiologic studies. J Clin Epidemiol. 1990;43(1):87-91. PMID: 2319285.
Friday, February 26, 2016 9:35 am – 12:35 pm	• Prediction accuracy ▷ Steyerberg EW, Vickers AJ, Cook NR, et al. Assessing the performance of prediction models: a framework for traditional and novel measures. Epidemiology. 2010;21(1):128–38. PMID: 20010215. ▷ Cook NR. Use and misuse of the receiver operating characteristic curve in risk prediction. Circulation. 2007;115(7):928–35. PMID: 17309939. † Pepe MS, Fan J, Feng Z, Gerds T, Hilden J. The Net Reclassification Index (NRI): a Misleading Measure of Prediction Improvement Even with Independent Test Data Sets. Stat Biosci. 2015;7(2):282–295. PMID: 26504496.

Date	Agenda (● = topic, ▷ = required reading, † = optional reading)
Friday, March 11, 2016 9:35 am – 12:35 pm	● Biomarkers and molecular epidemiology ▷ Rothman N, Stewart WF, Schulte PA. Incorporating biomarkers into cancer epidemiology: a matrix of biomarker and study design categories. Cancer Epidemiol Biomarkers Prev. 1995;4(4):301–11. PMID: 7655323. ▷ Caporaso NE. Integrative study designs–next step in the evolution of molecular epidemiology? Cancer Epidemiol Biomarkers Prev. 2007;16(3):365–6. PMID: 17372231. † Tworoger SS, Hankinson SE. Use of biomarkers in epidemiologic studies: minimizing the influence of measurement error in the study design and analysis. Cancer Causes Control. 2006;17(7):889–99. PMID: 16841256.
Friday, March 18, 2016 9:35 am – 12:35 pm	● Measurement error in cancer epidemiology (Guest: Dr. Lusine Yaghjyan) ▷ Von Euler-Chelpin M, Kuchiki M, Vejborg I. Increased risk of breast cancer in women with false-positive test: the role of misclassification. Cancer Epidemiol. 2014;38(5):619-22. PMID: 25035157. ▷ Platz EA, De Marzo AM, Giovannucci E. Prostate cancer association studies: pitfalls and solutions to cancer misclassification in the PSA era. J Cell Biochem. 2004;91(3):553-71. PMID: 14755685.
Friday, March 25, 2016 9:35 am – 12:35 pm	● Variable selection ▷ Greenland S. Invited commentary: variable selection versus shrinkage in the control of multiple confounders. Am J Epidemiol. 2008;167(5):523-9. PMID: 18227100. ▷ Schneeweiss S, Rassen JA, Glynn RJ, Avorn J, Mogun H, Brookhart MA. High-dimensional propensity score adjustment in studies of treatment effects using health care claims data. Epidemiology. 2009;20(4):512-22. PMID: 19487948.
Friday, April 1, 2016 9:35 am – 12:35 pm	● Attributable fractions ▷ Greenland S, Robins JM. Conceptual problems in the definition and interpretation of attributable fractions. Am J Epidemiol. 1988;128(6):1185–97. PMID: 3057878. ▷ Modern Epidemiology, pages 62–67, 295–297.
Friday, April 8, 2016 9:35 am – 12:35 pm	● Dose-response relationships ▷ Greenland S. Dose-response and trend analysis in epidemiology: alternatives to categorical analysis. Epidemiology. 1995;6(4):356–65. PMID: 7548341. ▷ Steenland K, Deddens JA. A practical guide to dose-response analyses and risk assessment in occupational epidemiology. Epidemiology. 2004;15(1):63–70. PMID: 14712148. ▷ Modern Epidemiology, pages 308–321.
Friday, April 15, 2016 9:35 am – 12:35 pm	● Whole exposome studies ▷ Wild CP. The exposome: from concept to utility. Int J Epidemiol. 2012;41(1):24–32. PMID: 22296988 ▷ Wild CP. Complementing the genome with an "exposome". Cancer Epidemiol Biomarkers Prev. 2005;14(8):1847–50. PMID: 16103423. † Joffe M, Gambhir M, Chadeau-Hyam M, Vineis P. Causal diagrams in systems epidemiology. Emerg Themes Epidemiol. 2012;9(1):1. PMID: 22429606.

Course Materials and Technology. Most reading for the course will be drawn from the articles cited in the above schedule. A few readings are drawn from the following required textbook, which may also prove useful for understanding key terms or formulas in the articles that were not fully elaborated upon:

- Rothman K, Greenland S, and Lash T. Modern Epidemiology, Third Edition. Philadelphia, PA: Lippincott Williams & Wilkins, 2008.

For technical support for this class, please contact the UF Help Desk at: Learning-support@ufl.edu, (352) 392-HELP - select option 2, or https://lss.at.ufl.edu/help.shtml.

Academic Requirements and Grading

The assessment is based primarily on article reviews that are due before the start of class each week. Students are to turn in reviews of the articles for discussion *in advance* of the class in which they are covered. A review form template is provided on the course website; following this guide, reviews are expected to be roughly 2 pages in length.

Students do not need to understand every aspect of the readings when they write their review. Indeed, I anticipate that several of the articles will be rather challenging to complete. Our class discussions will be most useful when students point out what parts of the readings were confusing, and the group can devise general strategies for clarifying unfamiliar methodologies.

A total of 10 reviews will be graded for each student, with each review and corresponding class participation worth 10 points. Students must be present in the class to get credit for their review. There are 13 eligible reviews (all sessions except the first), and the highest 10 grades will be summed for a final course grade (so, students may choose to complete only 10, or may complete more than 10 with the goal to replace lower grades).

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 three scheduled sessions without excuse (each session is about 3 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.

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/sccr/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.umatter.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.