



**DEPARTMENT: EH**

**COURSE NUMBER: 530**

**SECTION NUMBER: 3491**

**CREDIT HOURS: 2**

**SEMESTER: Spring 2019**

**COURSE TITLE: Environmental and Occupational Epidemiology**

**CLASS HOURS AND LOCATION: 3:00 – 4:50 PM, CNR 5001**

**PREREQUISITES: EPI 530 and BIOS 500, or consent of instructor**

**INSTRUCTOR NAME:** Matthew Gribble

**INSTRUCTOR CONTACT INFORMATION:**

EMAIL: matt.gribble@emory.edu

PHONE: 404-712-8908

SCHOOL ADDRESS OR MAILBOX LOCATION: CNR 2023

**OFFICE HOURS:** 2 – 3 PM Fridays (immediately before class) or by appointment

**TEACHING ASSISTANTS:**

Sydney Shuk – sydney.shuk@emory.edu

Lisa Emerson – lisa.emerson@emory.edu

**TA OFFICE HOURS:** (Sydney) Tuesdays 12-1 PM, in CNR 2<sup>nd</sup> floor kitchen area  
(Lisa) Wednesdays 1-2 PM, in CNR 2<sup>nd</sup> floor kitchen area

**COURSE DESCRIPTION**

Environmental and Occupational Epidemiology is a course for students in the Environmental Health Department who have successfully completed their first semesters of epidemiology and biostatistics. Students will gain experience reading, evaluating, and interpreting epidemiologic studies on the impact of both workplace and environmental exposures, and thinking through practical considerations. The course aims to strengthen each student's ability to read epidemiological literature critically. This aim will be realized through in-depth exploration of major study designs including cross-sectional studies, cohort studies, and case-control studies; and through the weekly readings and case studies. Although some data analysis is required, the focus of the class is on conceptual issues common in environmental and occupational epidemiology research and on the interpretation of findings. Successful completion of the course will also contribute to a richer appreciation of how the environment affects public health.

## MPH CONCENTRATION COMPETENCY:

- Apply the principles of epidemiology to assess health effects of environmental exposures

## COURSE LEARNING OBJECTIVES:

- Independently and confidently read published epidemiologic studies.
- Correctly apply common terminology to describe epidemiologic study designs and sources of bias.
- Interpret different measures of association and the results of multivariable statistical models.
- Understand the assumptions needed for various epidemiological study designs to be valid.
- Express criticism in a thoughtful, constructive, and respectful manner.

## EVALUATION

Evaluation is based on two exams (50%), on regular classroom participation (25%), and homework assignments (25% total for all the written case studies, writing responses, and homework problem set). Class attendance is expected; if you need to miss class then e-mail me before class. This is intended to be a discussion-based classroom and so it is essential that you complete all assigned readings (what is listed on a date is homework that night, due before the next class), even if no writing assignments are due with that reading. It is okay if you struggle with some of the readings, we will be discussing in class.

**Case Studies:** The case studies are an important part of assessing the MPH concentration competency, as students will apply epidemiological concepts such as confounding, information bias, effect modification, and selection bias to interpret findings from peer-reviewed epidemiological literature on environmental health concerns. Each case study shall be assigned a week in advance and is **due before the next class** (uploaded to Canvas). Students **must also bring a copy of their answers to class** (an electronic copy is okay). The goal of these assignments is to stimulate thoughtful reflection prior to class, and richer discussion during class, so you must have your answers with you and ready to discuss.

Case studies demand deep, careful thinking; you should anticipate that a case study will take 3 or 4 hours to complete, and there are right and wrong answers. I do not expect that you will get every answer correct, but I do expect that you will make a sincere attempt to answer all the questions well. Students who attend class and who turn in a thoughtfully-completed case study will get full credit (even if some answers are wrong). Case studies that were hastily done or that contain many mistakes will not receive full credit. My intent is to reward students who work hard on the case studies. Students may work together on the case studies. **Each student must write his or her own answers. Do not copy.**

**Writing Responses:** Writing responses (approx. 500 words) are meant to help you think more broadly and creatively about the connections of assigned articles to the themes of the course. **Upload your response before the next class.** All thoughtful, reasonable responses will receive full credit.

**Homework Problem Set:** In the second week, you will complete questions at the end of a textbook chapter (Rothman Chapter 3). **This is due before class on February 1.**

**Exams:** A week before each exam I will provide you with a journal article to read (multiple times before the exam). The written part of the exam is an important part of the assessment of the MPH Concentration Competency, as students will respond to short answer questions about an environmental health report, identifying major sources of systematic and random error and making recommendations for improved epidemiological investigation. You are encouraged to discuss the article with classmates, but there is to be no discussion of exam questions among peers at any time including after the course has ended. Both the midterm and the final are 2-hour, closed-book, in-class exams. Each exam is worth 25% of the final grade.

## REQUIRED COURSE TEXT

Epidemiology: An Introduction (2<sup>nd</sup> edition) by Ken Rothman (2012) Oxford University Press is required. This book does an excellent job covering the core concepts in this course, and its other chapters beyond the scope of this class will provide a useful reference as your careers in environmental health extend beyond this classroom. The other required texts for this course are your notes from EPI 530 and BIOS 500. You will want to refer to them throughout the semester.

## INCLUSIVE CLASSROOM

In addition to the lecture format, throughout the course, there also will be dedicated periods for more open discussion to foster a student-engaged dialogue regarding the core concepts and ideas of the class (e.g., how the concepts relate to contemporary events, study design challenges in studying selected topics, social and ethical dimensions, etc.). After the first session, students will be tasked with revising a Google Document of class “Ground Rules” for optimal class discussions. These Ground Rules will be reviewed in the second session and applied to subsequent class discussions.

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 these with me and the Office for Equity and Inclusion, 404-727-9877.

## RSPH POLICIES

### 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))

### COURSE CALENDAR

Date	Topic
1/18	<b><i>Class Theme: Epidemiology as Critical Toolbox for Environmental Health</i></b> Review Syllabus Lecture 1: Introduction to Environmental Epidemiology <b><i>Assignment:</i></b> <ul style="list-style-type: none"><li>• Edit the Ground Rules Google Doc by 10 PM of Thursday 1/19</li></ul>

1/25	<p><b><i>Class Theme: Epidemiology as Critical Toolbox for Environmental Health</i></b>  Lecture 1 Continued: Introduction to Environmental Epidemiology  <b>Assignment:</b></p> <ul style="list-style-type: none"> <li>• Read Rothman Chapter 3 “What Is Causation” pages 23-37</li> <li>• Problem Set Homework / “Open Book Quiz”: Rothman Chapter 3 end-of-chapter questions</li> <li>• Read Künzli et al. (2006) “Health Effects of the 2003 Southern California wildfires on children”</li> </ul>
2/1	<p><b><i>Class Theme: What to Expect in an Epidemiological Research Report</i></b>  Discuss Rothman Chapter 3 homework  Lecture 2: Epidemiology in Practice  TA Presentation: Walking through a paper (Künzli et al. 2006)  <b>Assignment:</b></p> <ul style="list-style-type: none"> <li>• Read STROBE Statement</li> <li>• Read Stein et al (2016) “Early Childhood Adversity Potentiates the Adverse Association Between Prenatal Organophosphate Pesticide Exposure and Child IQ: the CHAMACOS Cohort”</li> <li>• Apply STROBE checklist to Stein et al (2016) “Early Childhood Adversity Potentiates the Adverse Association Between Prenatal Organophosphate Pesticide Exposure and Child IQ: the CHAMACOS Cohort”</li> </ul>
2/8	<p><b><i>Class Theme: Cross-Sectional Studies</i></b>  Discuss Stein et al. 2016 STROBE checklist homework  Lecture 3: Cross-sectional studies  <b>Assignment:</b></p> <ul style="list-style-type: none"> <li>• Read Greens et al. (2014) “Determinants of bisphenol A and phthalate metabolites in urine of Flemish adolescents”</li> <li>• Greens et al. (2014) case study due (uploaded to Canvas before start of next class)</li> </ul>
2/15	<p><b><i>Class Theme: Cross-Sectional Studies</i></b>  Discuss Greens et al. 2014 case study and STROBE checklist.  Lecture 4: Cross-Sectional Studies Review  <b>Assignment:</b></p> <ul style="list-style-type: none"> <li>• Read Seldén et al. (2009) “Nephrotoxicity of uranium in drinking water from private drilled wells”</li> <li>• Apply STROBE checklist and complete case study for Seldén et al. (2009)</li> </ul>
2/22	<p><b><i>Class Theme: Ecological and Atomistic Bias</i></b>  Discuss Seldén et al. 2009 case study and STROBE checklist.  Lecture 5: Ecological Studies, Time-Series and other Group-Level Designs  Guest Lecture: Stefanie Sarnat, “Temperature and Health”  <b>Assignment:</b></p> <ul style="list-style-type: none"> <li>• Read Winquist et al. (2016) “Warm season temperatures and emergency</li> </ul>

	<p>department visits in Atlanta, Georgia”</p> <ul style="list-style-type: none"> <li>• Upload writing response to Canvas before start of next class.</li> </ul>
3/1	<p><b>Class: MIDTERM REVIEW</b></p> <p>Discuss Winquist et al. writing response (Ground Rules apply) and STROBE checklist.</p> <p>Review for midterm exam.</p> <p><b>Assignment:</b></p> <ul style="list-style-type: none"> <li>• Read assigned article for the mid-term exam (will be a cross-sectional study).</li> </ul>
3/8	<ul style="list-style-type: none"> <li>• <b>Closed book midterm exam.</b> <i>Calculators/cell phones/class notes not permitted.</i></li> <li>• I will give you a clean copy of the article at the time of the exam.</li> </ul> <p><b>Assignment:</b></p> <ul style="list-style-type: none"> <li>• Read Chapter 5 “Types of Epidemiologic Studies” in Rothman (2012) pp. 69-87.</li> </ul>
3/15	<p>SPRING BREAK – NO CLASS</p> <ul style="list-style-type: none"> <li>• Optional but encouraged reading: Bratman et al. (2012) “The impacts of nature experience on human cognitive function and mental health.” Optional but encouraged activity: enjoy someplace outdoors</li> <li>• Extra Credit Opportunity - Hipp and Ogunseitani (2011) “Effect of environmental conditions on perceived psychological restorativeness of coastal parks.” Case study and STROBE checklist must be uploaded to Canvas before 3/22.</li> </ul>
3/22	<p><b>Class Theme: Cohort Studies</b></p> <p>Lecture 6: Cohort studies</p> <p><b>Assignment:</b></p> <ul style="list-style-type: none"> <li>• Read Casey et al. (2016) “Unconventional natural gas development and birth outcomes in Pennsylvania, USA.”</li> <li>• Casey et al. (2016) case study and STROBE checklist due at start of next class.</li> </ul>
3/29	<p><b>Class Theme: Cohort Studies</b></p> <p>Discuss Casey et al. 2016 case study (Ground Rules apply) and STROBE checklist.</p> <p>Lecture 7: Cohort Studies Review</p> <p><b>Assignment:</b></p> <ul style="list-style-type: none"> <li>• Read Moon et al. (2013) “Association between Low to Moderate Arsenic Exposure and Incident Cardiovascular Disease. A Prospective Cohort Study”</li> <li>• Moon et al. (2013) case study due at start of next class.</li> </ul>
4/5	<p><b>Class Theme: Interactions and Susceptibility</b></p> <p>Discuss Moon et al. 2013 case study (Ground Rules apply) and STROBE checklist.</p> <p>Lecture 8: Susceptibility in environmental epidemiology</p> <p><b>Assignment:</b></p> <ul style="list-style-type: none"> <li>• Read Zhang et al. (2016) “Sex-Specific and Time-Varying Associations between Cigarette Smoking and Telomere Length among Older Adults”</li> <li>• Zhang et al. (2016) case study uploaded to Canvas before start of next class.</li> </ul>

	<ul style="list-style-type: none"> <li>• Read Chapter 5 “Types of Epidemiologic Studies” in Rothman (2012) pp. 88-109</li> </ul>
4/12	<p><b><i>Class Theme: Case-Control Studies</i></b></p> <p>Discuss Zhang et al. 2016 case study (Ground Rules apply) and STROBE checklist. Lecture 9: Case-control studies.</p> <p><b><i>Assignment:</i></b></p> <ul style="list-style-type: none"> <li>• Read Gullar et al. 2002 NEJM mercury and fish oils and myocardial infarction</li> <li>• Guallar et al. (2002) population-based case-control case study due at start of next class.</li> </ul>
4/19	<p><b><i>Class Theme: Review Three Major Study Designs in Epidemiology</i></b></p> <p>Discuss Guallar et al. 2002 case study (Ground Rules apply) and STROBE checklist. Lecture 10: Case-Control Studies Review.</p> <p><b><i>Assignment:</i></b></p> <ul style="list-style-type: none"> <li>• Read McLean et al. (2014) “Occupational solvent exposure and risk of meningioma: results from the INTEROCC multicentre case-control study”</li> <li>• McLean et al. (2014) writing response</li> </ul>
4/26	<p><b><i>Class Theme: FINAL EXAM REVIEW</i></b></p> <p>Discuss writing response (Ground Rules apply) and STROBE checklist. Final Exam Review</p> <p><b><i>Assignment:</i></b></p> <ul style="list-style-type: none"> <li>• Read assigned article for the final exam (will be a cohort or case-control study).</li> </ul>
5/03	<p><b>Closed book final exam.</b></p> <ul style="list-style-type: none"> <li>• I will give you a clean copy of the article at the time of the exam.</li> <li>• <i>Calculators/cell phones/class notes are not permitted.</i></li> </ul>