ENV H / EPI 570 Syllabus, Spring 2015
Occupational and Environmental Epidemiology
Tuesday and Thursday, 11:00-12:20
Health Sciences Building, Room RR-134

Instructor:
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Course web site: https://canvas.uw.edu/courses/ 965194

Office hours: No scheduled office hours. Students can contact instructor by phone or e-mail, or visit his office on an appointment basis.

Lab sessions: Classes on April 2, April 16, Apr 28, May 5, and May 14 will be held in the Health Sciences Library Classroom A

Prerequisites:
Previous introductory courses in epidemiology (e.g., EPI 511, 512, 513) and biostatistics (e.g., BIOST 512 or 518), or permission of instructor

Course overview:
This course is for graduate students who have had introductory courses in epidemiology and biostatistics. A study- and case-oriented approach is used to cover principles of environmental and occupational epidemiology, covering a wide range of study designs and biases, exposures and exposure estimation approaches. While the course will not provide comprehensive coverage of all subject areas in the field, we draw studies and cases from a variety of settings in which environmental or occupational exposures occur. Each class will consist of an overview discussion and an in-depth assessment of one or at most two studies. Five data analysis labs are designed to help students gain more in-depth

familiarity with the topics. Additional topics include climate change, gene-environment interaction, biomarkers and the role of epidemiology in policy and causal inference. Assignments consist of: 1) lab write-ups which will include addressing questions pertaining to the relevant study design, and 2) a term paper designed to be a short research proposal (in NIH R21 format) on a topic chosen by the student and approved by the instructor. By the end of the course, students should gain sufficient understanding of epidemiologic methods for environmental and occupational exposures to feel comfortable understanding and evaluating the published epidemiologic literature and, in some instances, designing and conducting original research. .

Learning objectives:

1. Demonstrate an ability to critically review environmental and occupational epidemiology literature for in-class discussion.
2. Identify the most suitable epidemiologic study designs for investigating specific exposure-disease associations.
3. Recognize environmental and occupational epidemiology study biases and describe methods for minimizing bias.
4. Describe some of the major chemical, physical, and biological agents that cause environmentally- and occupationally-related diseases.
5. Describe methods for assessing human exposures to hazardous agents, including the use of biomarkers, for epidemiologic research purposes.
6. Describe how genetic makeup influences risk of environmental and occupational exposures and identify the variety of studies used to investigate gene by environment interactions.
7. Recognize challenges and opportunities in carrying out epidemiological studies on climate change.
8. Describe how epidemiologic studies play a role in risk assessment and in influencing public health policy, including exposure standards and guidelines.
9. Describe how epidemiologic findings are used to make causal inferences, and how they can be misused in research and policy arenas.
10. Demonstrate an ability to analyze environmental and occupational data using statistical software in investigating exposure-disease associations.

Course requirements:

1. **Lab write-ups / Homework**. 40%
    a. Present the results of your data analysis and interpret your results for each of the **five lab sessions**; address the questions posed at the end of the assignments – these will also include questions from the relevant class sessions.
    b. Guidelines:
        i. Briefly introduce the context, data, and scientific questions posed
        ii. Very briefly summarize your methods (i.e. analysis approach)
        iii. Clearly and succinctly summarize your results in both tables/figures and text.
        iv. Include a focused discussion of your findings that addresses the scientific questions posed
        v. Create tables and figures. Formatting guidelines:
            1. Include appropriately labeled titles, axes, units, and footnotes
            2. Show the appropriate number of significant figures
2. **Class participation**. 20%
    a. Attend and engage in classroom discussion
    b. Discussion will focus on one, or at most two, assigned readings of published studies for each class.
3. **Take-home final examination**. Term paper (Study research proposal). 40%.
    a. Research proposal (similar to NIH R21 format) that includes a review of the literature on a relevant topic and a proposed research design (hypotheses, population sample, design, analysis approach)
    b. Due by start of class Thursday June 4, 2015
    c. Topics must be approved in advance. All students should have identified and vetted their preliminary paper concept by April 30; final topic approval is due no later than May 14.
    d. Maximum length: 12 pages, double-spaced, including tables and figures. Length does not include references, title page or abstract.

Readings (most are available through the course website)

a. **Required**: Selected journal articles are required reading in advance of each class. The class schedule includes the preliminary readings list. The website has the final list of papers and links to the electronic version of each assigned article in the modules section.

b. No required textbook

c. Supplementary reference textbook (not required): Rosenstock L, Cullen MR, Brodkin CA, Redlich CA (eds). *Textbook of Clinical Occupational and Environmental Medicine* 2nd Ed. Philadelphia: WB Saunders, 2005.

c. Multiple additional resources are posted on the class website in the "warehouse of papers"

Accommodation: To request academic accommodations due to a disability, please contact Disabled Student Services, 448 Schmitz (206) 543-8924 (V/TTY). If you have a letter from Disabled Student Services indicating that you have a disability that requires academic accommodations, please present the letter to the instructor in order to discuss the accommodations you might need in this class.

SCHEDULE (Subject to change)

Date	Topic (Instructor)	Reading(s) [suggested]	Assignments
Week 1			
Mar 31	Course introduction & study designs (SV)		
Apr 2	Study designs (contin) / Bias 1	Morgenstern 1993	Review of Stata (Lab 1)
Week 2			
Apr 7	Ecologic / cross-sectional studies (SV) **Lab 1**: Intro to Stata; Multiple linear regression	Pope 2009	Read lab 1 materials

Apr 9	Bias 2: measurement error / selection / healthy worker effect (SV)	Kirkeleit 2013; [Naimi 2013]	
Week 3			
Apr 14	Case-control (CaCo) studies (SV)	Ruckart 2013	Lab 1 write-up
Apr 16	**Lab 2**: CaCo studies & logistic regression (SV)	Steenland 1990	Read lab 2
Week 4			
Apr 21	Cohort studies (SV)	Attfield 2012 Lloyd 1971	
Apr 23	Cohort / nested CaCo / case-cohort (SV)	Silverman 2012	Lab 2 write-up
Week 5			
Apr 28	**Lab 3:** Cohort & nested CaCo (Nickel refiners study) (SV)	B&D 1987 excerpts [Peto 1984; Kaldor 1986]	Read lab 3
Apr 30	Gene x environment (SV)	Hunter 2005	Identify paper topic
Week 6			
May 5	**Lab 4:** Molecular epi / biomarkers (SV)	Dunn 1991	Read lab 4; Lab 3 write-up
May 7	DNA damage & epigenetics (PB)	TBA	
Week 7			
May 12	Time series / case-crossover studies (SV)	Gasparrini 2011 Bhaskaran 2013 [Janes 2005]	

May 14	**Lab 5**: Time series (Armstrong study) (SV)	Bhaskaran 2013	Read lab 5; Paper topic approved
Week 8			
May 19	Radiation case study (Chernobyl) (SD)	Davis 2004	
May 21	Panel studies (SV)	Janes 2008	Lab 5 write-up
Week 9			
May 26	Climate change (SV)	TBA	
May 28	Case series / clusters / surveillance (SV)	Anto 1989	
Week 10			
Jun 2	Epi in risk assessment and policy (SV)	Nachman 2011	
Jun 4	Manufactured uncertainty / publication bias (SV)	Michaels 2005 Ioannidis 2005	Term paper (research study proposal) due