ENV H / EPI 570 Syllabus, Spring 2018
Occupational and Environmental Epidemiology
Tuesday and Thursday, 11:30-12:50
Health Sciences Building, Room E-216

Instructor:
Sverre Vedal, MD MSc
Department of Environmental & Occupational Health Sciences, Box 357234
Office: Roosevelt 303; Phone: 206-616-8285
e-mail: svedal@uw.edu

Course web site: https://canvas.uw.edu/courses/1139051

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 3 (Lab B), April 12 (Lab C), April 24 (Lab B), May 1 (Lab C), and May 10 (Lab C) will be held in the Health Sciences Library

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 combination of lectures and 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, exposure estimation approaches and health effects. 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 and data analysis methods. 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 that 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 in investigating exposure-disease associations using statistical software.

Course requirements:

1. **Lab write-ups / Homework**. 50%

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 may 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.

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). 30%.

   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 May 31, 2018

   c. Topics must be approved in advance. All students should have identified and vetted their preliminary paper concept by April 26; final topic approval is due no later than May 10.

   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 Canvas 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.

Classroom Climate: The student experience in this class is important to me (Sverre Vedal, instructor). The UW School of Public Health seeks to ensure that all students are fully included in each course. We strive to create an environment that reflects community and mutual caring. We encourage students with concerns about classroom climate to talk to your instructor, your advisor, or a member of the departmental (DEOHS) or SPH Diversity Committee and/or your program director.

Access and accommodations
If you have already established accommodations with Disability Resources for Students (DRS), please communicate your approved accommodations to me at your earliest convenience so we can discuss your needs in this course. If you have not yet established services through DRS, but have a temporary health condition or permanent disability that requires accommodations, you should contact DRS at 206-543-8924 or uwdrs@uw.edu or disability.uw.edu. Qualifying conditions include but are not limited to mental health, attention-related, learning, vision, hearing, physical or health impacts. DRS offers resources and coordinates reasonable accommodations for students with disabilities and/or temporary health conditions. Reasonable accommodations are established through an interactive process between you, your instructor and DRS. It is policy and practice of the University of Washington to create inclusive and accessible learning environments consistent with federal and state law.

Academic integrity
Students at the University of Washington are expected to maintain the highest standards of academic conduct, professional honesty, and personal integrity. The UW School of Public Health (SPH) is committed to upholding standards of academic integrity consistent with the academic and professional communities of which it is a part. Plagiarism, cheating, and other misconduct are serious violations of the University of Washington Student Conduct Code (WAC 478-120). We expect you to know and follow the university's policies on cheating and plagiarism, and the SPH Academic Integrity Policy. Any suspected cases of academic misconduct will be handled according to University of Washington regulations. For more information, see the University of Washington Community Standards and Student Conduct website.

SCHEDULE (Subject to change)

Date	Topic	Reading(s) [suggested]	Assignments
Week 1			
Mar 27	Course introduction & study designs		
Mar 29	Study designs (contin) / Bias 1	Morgenstern 1993	Review of R/Stata (Lab 1)
Week 2			
Apr 3	Ecologic / cross-sectional studies **Lab 1**: Intro to R/Stata; Multiple linear regression	Pope 2009	Read lab 1 materials
Apr 5	Bias 2: measurement error / selection / healthy worker effect	Kirkeleit 2013; [Naimi 2013]	
Week 3			
Apr 10	Case-control (CaCo) studies	Ruckart 2013	Lab 1 write-up
Apr 12	**Lab 2**: CaCo studies & logistic regression	Steenland 1990	Read lab 2
Week 4			
Apr 17	Cohort studies	Attfield 2012 Silverman 2012	
Apr 19	Cohort / nested CaCo / case-cohort	B&D 1987 excerpts [Peto 1984; Kaldor 1986] Lloyd 1971	Lab 2 write-up
Week 5			
Apr 24	**Lab 3:** Cohort & nested CaCo (Nickel refiners study)		Read lab 3
Apr 26	Gene x environment	Hunter 2005	Identify paper topic

Week 6			
May 1	**Lab 4:** Molecular epi / biomarkers	Dunn 1991 Schmidt 2006	Read lab 4
May 3	DNA damage & epigenetics	Ladd-Acosta 2105 Rusiecki 2017	Lab 3 write-up
Week 7			
May 8	Time series / case-crossover studies	Gasparrini 2011 Bhaskaran 2013 [Janes 2005]	
May 10	**Lab 5**: Time series (Armstrong study)	Bhaskaran 2013	Read lab 5; Paper topic approved Lab 4 write-up
Week 8			
May 15	Radiation case study (Chernobyl) – Scott Davis instructor	Davis 2004	
May 17	Panel studies	Janes 2008	Lab 5 write-up
Week 9			
May 22	Climate change	Banu 2014	
May 24	Case series / clusters / surveillance	Anto 1989	
Week 10			
May 29	Presentation of student research project proposals		
May 31	Presentations continued Epi in risk assessment and policy; Manufactured uncertainty / publication bias	Nachman 2011 Michaels 2005 Ioannidis 2005	Term paper (research study proposal) due