Public Health 103: Concepts of Epidemiology
Monday, Wednesday: 2-3:15 pm
Hutch 141

Instructors: Edwin van Wijngaarden, PhD (Course Director)
Associate Professor of Public Health Sciences, Environmental Medicine, and Dentistry
Chief, Division of Epidemiology
Director, Doctoral Program in Epidemiology
edwin_van_wijngaarden@urmc.rochester.edu

Per October 1:
Courtney Jones, PhD (Course Co-Director)
Assistant Professor of Emergency Medicine and Public Health Sciences
courtney_jones@urmc.rochester.edu

Teaching Assistants: Marissa Abbott (mabbott6@u.rochester.edu)
Megan Suter (msuter@u.rochester.edu)

Office hours: By Appointment (Professors Van Wijngaarden and Jones, Marissa Abbott, Megan Suter), Tuesday 1-2 pm (Marissa Abbott), Wednesday 5-6 pm (Megan Suter)
Office hours' location: SRB 3.313 (Professor van Wijngaarden), SRB 2.124 (Professor Jones), TBD (TAs)

Textbook: *Friis RH. Epidemiology 101. Jones and Bartlett Publishers, Inc.: 2009*. Materials from this textbook will be supplemented with manuscripts from the peer-reviewed literature and other pertinent documents.

Course description: This course provides beginning students with an understanding of the fundamental concepts to understand health-related information and health policy. The course will introduce students to the history of epidemiology, and the basic methodological principles used to describe disease occurrence in populations and identify causes of disease. These concepts are subsequently discussed in the context of health policy, outbreak investigations, and epidemiological specialties. Students are responsible for weekly readings, two in-class exams, and two short essays. Optional assignments will help students understand and apply the materials covered in the readings and lectures.

Prerequisites: None

Learning Objectives: Upon completion of this course, students should be able to:

- Discuss the history, philosophy, and uses of epidemiology;
- List sources of epidemiologic data and define related measures of morbidity and mortality;
- Define the term "descriptive epidemiology", and describe the types of descriptive studies and their application;
- Define the term "analytic epidemiology", and describe the types of analytic studies and their application;
- Understand the challenges inherent in obtaining and interpreting epidemiologic data;
- State what is meant by the terms "association" and "causation";
- Describe applications of epidemiology to outbreak investigation, environmental and occupational health, and social and behavioral phenomena.

Student Evaluation: The grade for the course will be determined by the following:

- Midterm exam: 30% (30 points)
- Essays: 30% (each essay will be worth 15 points)
- Homework: 10% (10 points)
- Final Exam: 30% (30 points)

Extra Credit: We would like to provide you with the opportunity to earn extra credit by identifying examples of media reports that cover newly-published epidemiologic studies. These examples will demonstrate the ubiquity of epidemiology in daily life, and may provide materials for in-class discussion. For 1 extra percentage point (added to your final grade), you are invited to submit three examples of media coverage of a newly-published epidemiologic study; one example published during the month of September 2013, one example published in October 2013, and one example published in November 2013. Media coverage could be written, video or oral reports published online or in print (for written coverage). **You will need to submit all three examples by the end of each respective month to receive extra credit (e.g. you may not submit media coverage dated from September in October or November).** Please email the article to Drs. van Wijngaarden and both TAs; we will confirm that the report indeed covers an epidemiologic study. Final decisions about the appropriateness of the materials are up to the discretion of the instructor. All students who submit appropriate media coverage will receive the extra point.

Academic Honesty: Students and faculty at the University must agree to adhere to high standards of academic honesty in all of the work that we do. As freshmen, students read and sign an academic honesty policy statement to indicate that they understand the general principles upon which our work is based. The College Board on Academic Honesty website gives further information on our policies and procedures: www.rochester.edu/college/honesty. You are encouraged to discuss course readings and assignments with your fellow students. However, you must **not retain** written notes from your conversations with other students. Your written work must be completed without reference to such notes, with the exception of class and recitation notes, which may be retained in written form. All written work must be done independently and not in collaboration with another. In order to make appropriate help available for your essays, I encourage you to consult with me and with the College Writing Center.

Class Schedule:

Week	Date	Topic	Readings*	Assignment
1	9/2	No class (Labor Day)	-	-
	9/4	Introduction, Course Overview, Definition of Epidemiology, History of Epidemiology	Ch. 1 pp 1-22	Q 1, 2, 6-9 (pp 23)
2	9/9	Case Study: Cell Phones and Health	Foster and Moulder 2000	**Complete online survey**
	9/11	Presentation of Data and Introduction to Types of Epidemiologic Measures	Ch. 2 pp 25-35	-
3	9/16	Measures of Morbidity and Mortality, Specific Rates, Adjusted Rates	Ch. 2 pp 35-41	Q 1-7 (pp 42)
	9/18	Additional Measures of Disease Occurrence: Maternal and Child Health	Ch. 3	-
4	9/23	Data Quality Considerations, Public Health Surveillance, Vital Statistics; PubMed	Ch. 3; Visit www.cdc.gov/nchs	Q 1-8 (pp 62)
	9/25	Uses and Types of Descriptive Studies	Ch. 4 pp 65-69	-
5	9/30	Person, Place, Time; Case Study: Autism	Ch. 4 pp 69-86; Blaxill 2004	Q 1-3, 9 (pp 87)
	10/2	Uses and Types of Observational Studies; Cohort Studies	Ch. 6 pp 105-114	**Essay 1 due**
6	10/7	No class (Fall Break)	-	-
	10/9	Case-Control Studies; Case Study: PMPs and Hearing Loss	Ch. 6 pp 105-114; Harrison 2008	Q 1, 2, 5-7, 11 (pp 119)
7	**10/11**	**Review Session (time and location TBD)**	**-**	Come prepared with questions
	10/14	**Review Session (regular class time and location)**	**-**	Come prepared with questions
	10/16	**Midterm Examination (regular class time and location)**	**-**	**-**
8	10/21	Estimation and Inference	Ch. 5 pp 89-97	Q 1, 2, 4, 5 (pp 102)
	10/23	Bias, Interaction	Ch. 5 pp 98-101; Setia 2008	-
9	10/28	Clinical Trials and Other Types of Experimental Studies	Ch. 6 pp 114-118; Grimes and Schulz 2002	-
	10/30	Screening	Ch. 7 pp 130-133; Hobson 2007	
10	11/4	Case Study: E-moms Clinical Trial (Speaker: Dr. Diana Fernandez, Associate Professor, Public Health Sciences)		Q 8, 9 (pp 119)

Week	Date	Topic	Readings*	Assignment
	11/6	Injury Epidemiology: An Introduction (Speaker: Dr. Courtney Jones)	Sleet and Moffett 2009; Rivara 2003	**Homework due**
11	11/11	Program Evaluation: An Introduction (Speaker: Dr. Ann Dozier, Associate Professor, Public Health Sciences)		-
	11/13	Case Study: Trauma Triage (Speaker: Dr. Courtney Jones)	http://www.cdc.gov/FieldTriage/pdf/DecisionScheme_Poster_a.pdf; http://www.cdc.gov/fieldtriage/pdf/Accurate_Field_Triage_Injured_Patient_Saves_Lives_Money_Fact_Sheet-a.pdf	
12	11/18	Case Study: Colon Cancer Screening (Speaker: Dr. Jim Dolan, Associate Professor, Community and Preventive Medicine)	Ladouceur 2008; Pineau 2008; Turcotte 2008	Q 7-9 (pp 134)
	11/20	Infectious Diseases: Transmission and Epidemiology; Investigating Infectious Disease Outbreaks (Speaker: Dr. Courtney Jones)	Ch. 8 137-156; Reingold 1998	-
13	11/25	Case Study: Hospital Epidemiology (Speaker: Dr. Ghinwa Dumyati, Associate Professor of Medicine, Infectious Diseases and Center for Community Health)	Sydnor and Perl 2011	-
	11/27	No class (Thanksgiving Break 11/21-11/25 begins at noon)	-	-
14	12/2	Psychiatric Epidemiology (Speaker: Dr. Robert Bossarte, Assistant Professor, Department of Psychiatry)	Ch. 9 pp 159-177	Q 5-10 (pp 178)
	12/4	Molecular and Genetic Epidemiology; Investigating the Genetic Basis of Human Disease	Ch. 10 pp 181-184; Kaprio 2000; Herbert 1997	**Essay 2 due**
15	12/9	Environmental and Occupational Epidemiology; Investigating Cancer Clusters	Ch. 10 pp 184-192; Thun 2004	Q 3,4 (pp 195)
	12/11	**Review Session (regular class time and location)**	**-**	**-**
	12/17	**Final Examination (4-7 pm, location TBD)**	**-**	**-**

*Readings refer to book chapter or to articles that you can access from BlackBoard (see “course schedule” tab)

Readings (available from BlackBoard):

Blaxill MF. What's going on? The question of time trends in autism. Public Health Rep 2004;119(6):536-51.

Brownson RC, Gurney JG, Land GH. Evidence-Based Decision Making in Public Health. J Public Health Management Practice 1999; 5(5):86-97.

Foster KR, Moulder JE. Are mobile phones safe? IEEE Spectrum 2000;37(8):23-28.

Grimes, Schulz. An overview of clinical research: The lay of the land. Lancet 2002; 359(9300):57-61.

Harrison RV. Noise-induced hearing loss in children: A 'less than silent' environmental danger. Pediatr Child Health 2008;13(5):377-82

Herbert W. How the nature vs. nurture debate shapes public policy -- and our view of ourselves. US News World Rep. 1997 Apr 21;122(15):72-74, 77-80.

Hobson K. To screen-or not? Questions to put to your physician before having a test. US News World Rep 2007;142(14):70, 73-4.

Kaprio J. Science, medicine, and the future. Genetic epidemiology. BMJ 2000;320(7244):1257-9.

Ladouceur R. Why does this controversy still exist? Can Fam Physician. 2008;54(4):493.

Pineau G. Should Canadians be offered systematic screening for colorectal cancer?: yes. Can Fam Physician 2008;54(4):504, 506, 508 passim.

Pineau G. Rebuttal: Should Canadians be offered systematic screening for colorectal cancer? YES. Can Fam Physician 2008;54(5):674, 676.

Pratt CA, Lemon SC, Fernandez ID, Goetzel R, Beresford SA, French SA, Stevens VJ, Vogt TM, Webber LS. Design characteristics of worksite environmental interventions for obesity prevention. Obesity 2007;15:2171–2180.

Reingold AL. Outbreak investigations--a perspective. Emerg Infect Dis 1998 Jan-Mar;4(1):21-7.

Rivara FP. Introduction: The scientific basis for injury control. Epidemiol Rev 2003;25:20-23.

Setia MS. Observational studies: How to go about them? Indian J Dermatol Venereol Leprol 2008;74:288-291.

Sleet DA and Moffett DB. Framing the problem: Injuries and public health. Fam Community Health 2009;32:88-97.

Sydnor ER, Perl TM. Hospital epidemiology and infection control in acute-care settings. Clin Microbiol Rev 2011;24(1):141-73.

Thun MJ, Sinks T. Understanding cancer clusters. CA Cancer J Clin 2004;54(5):273-80.

Turcotte F. Should Canadians be offered systematic screening for colorectal cancer?: no. Can Fam Physician 2008 Apr;54(4):505-6, 509, 511.

Turcotte F. Rebuttal: Should Canadians be offered systematic screening for colorectal cancer? NO. Can Fam Physician 2008;54(5):675, 677.

Zilberberg MD, Shorr AF. Understanding cost-effectiveness. Clin Microbiol Infect 2010;16(12):1707-12.

Essay 1: Descriptive Epidemiology (worth 15 points total)

Based on a review of pertinent epidemiological literature and other data sources that you have identified, give a 2-page (1.5-spaced, Arial font, font size 11) overview of the basic epidemiology of a health outcome of your choice. Please address the following 5 questions (worth 3 points each):

1. What sources did you use to describe the clinical and epidemiological characteristics of your selected health outcome? Please list at least 5 references (for example: government websites, scientific papers identified from www.pubmed.com or scholar.google.com). ***Note that Wikipedia as a source is not acceptable.*** For websites, please provide the URL and the date accessed. For scientific papers, please provide the authors' names, publication year, the title of the paper, and the journal title, volume, and page numbers. Use Vancouver Style for all your references. For example references formatted according to Vancouver Style, go to this website: http://www.lib.monash.edu.au/tutorials/citing/vancouver.html. ***Number the references, and cite the relevant reference(s) after every factual statement you make in the subsequent questions.***
2. How is the disease defined? That is, how is it diagnosed and what code is used to record it in database systems such as medical records or registries?
3. What kind of epidemiologic measures were you able to find in the literature? Were you able to find data on mortality, incidence, and prevalence? If you only found some of these, why do you think the other measures were not available?
4. How has the epidemiology of the disease changed over time? Is the disease more common now than it was in the past, or is the disease on the decline? Please describe patterns of disease occurrence over time using actual numbers.
5. How does the epidemiology of the disease vary across subgroups of the population (age, gender, race/ethnicity) and by geographic area (states, countries)? Please describe these patterns of disease occurrence using actual numbers.

Please choose from the following list of 29 diseases for your essay topic. ***Selection of other diseases for your essay is not encouraged and should be approved by the instructor or TAs before you start working on your essay***:

Malignant neoplasms	**Certain infectious and parasitic diseases**
Lung cancer	Tuberculosis
Skin cancer	Cholera
Breast cancer	Chlamydia
Prostate cancer	Rabies
Colon, stomach, pancreatic cancer	Meningitis
Nervous system tumors	Syphilis
Leukemia, lymphoma	Herpes
	Hepatitis
Stroke	HIV/AIDS
Ischemic heart disease	Malaria
Diabetes	
Depression, suicide	**Diseases of the nervous system**
Renal failure	Huntington's disease
Osteoporosis	Parkinson's disease
Asthma	Alzheimer's disease
Pneumonia and/or influenza	Multiple sclerosis

Essay 2: Association and Causality (worth 15 points total)

Based on a critical review of three original analytic observational human studies published in the peer-reviewed scientific literature, you evaluate the evidence for a cause and effect relationship that is of interest to you. Identify a question regarding a cause-effect relationship and search PubMed (www.pubmed.com) for relevant studies. To give you some inspiration, here are some examples:

Examples of broad exposure classes: "causes"	Examples of broad disease classes: "effects"
Dietary factors and nutrients (e.g., consumption of salt, fatty acids, sugars)	Nervous system disorders (see essay 1 for examples)
Physical activity (e.g., amount of "screen time")	Malignant neoplasms (see essay 1 for examples)
Pharmaceutical agents (e.g., aspirin, antibiotics)	Mental health (e.g., suicide, depression, anxiety)
Environmental agents (e.g., phthalates, heavy metals, solvents, electromagnetic fields)	Cardio/cerebrovascular health (e.g., ischemic heart disease, stroke, diabetes, metabolic syndrome)
Psychological or social stressors	Respiratory diseases (e.g., asthma, COPD)
Risky behaviors (e.g., smoking, alcohol, recreational drugs)	Pregnancy outcomes (e.g., birth weight, small for gestational age, preterm birth)

Some dos and don'ts for choosing articles:

- The three studies must be case-control, cohort, or cross-sectional studies.
- Do not include randomized controlled trials or other experimental studies in your essay.
- Do not use editorials, review articles, meta-analyses, letters to the editors, etc. as the basis for your essay. These are not original studies.
- Do not choose "smoking and lung cancer" as your essay topic.
- ***Please share the three articles you selected with the TAs before you start working on your essay.***

Address in no more than 3 pages (1.5-spaced, Arial font, font size 11) the following questions ***and explain your answers (this is critical!)***:

1. How were the studies conducted? For each of the three studies, briefly describe study design (e.g., cohort, case-control, cross-sectional), study population (sample size, recruitment strategy), how the disease was defined, how the exposure was measured, and what other variables were considered in the statistical analysis (e.g., to control for confounding). Each study should be summarized in five sentences or less. *(2 points)*
2. To what extent do the three studies support the strength guideline proposed by Bradford Hill? *(2 points)*
3. Do the three studies show consistent results? *(2 points)*
4. Was the temporality criterion satisfied by the three studies? *(2 points)*
5. Do the three studies provide support for a biological gradient? *(2 points)*
6. Was the relationship investigated in the three studies plausible from a theoretical perspective? *(2 points)*
7. Based on your responses to questions 2-6, do you believe that the three selected studies do or do not support a causal relationship between the exposure and disease? *(3 points)*