

**PUB HLTH 422**  
**INTERMEDIATE EPIDEMIOLOGY – 1.0 Credit**  
**Winter 2007 (January 3 – March 12, 2007)**

**Time:** Mondays 1:30-3:00 pm  
Wednesday 1:30-3:00 pm

**Location:** 680 N. Lake Shore Drive, Suite 1102, Small Conference Room

**Course Instructor (office hours by appointment):**

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**Guest Lecturer:**

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**I. Course Description**

This course is designed to familiarize students with a greater depth of knowledge in observational epidemiologic methods, and classical (a.k.a., stratified) methods of statistical analysis applied to observational epidemiologic studies. The material presented in this course will build upon the information presented in Introduction to Epidemiology or Medical Decision Making II. Specifically, this course will focus on the design, conduct, and interpretation of observational studies in human populations with a focus on analytic cross-sectional, case-control and cohort studies. Key issues related to the validity of measures of exposure and disease, and sources of potential errors in interpreting epidemiologic studies will be addressed.

**II. Prerequisites**

- a) Introduction to Epidemiology - 1480 C04 (or Medical Decision Making II)
- b) Introduction to Biostatistics - 1480 C02
- c) Student **MUST** receive permission from Instructors if the two courses listed above have not been completed.

**III. Course Objectives**

After completion of the course, students should be able to:

- a) Define hypotheses for epidemiologic studies based on the present state of knowledge.
- b) Describe observational epidemiologic study designs including cross-sectional, case-control and prospective or retrospective cohort study designs. In addition, they will be able to select the most appropriate of these for different hypotheses based on the advantages and disadvantage of each design.
- c) Define exposure variables, outcome variables, extraneous variables and measures of their frequency.
- d) Evaluate appropriate measurement instruments.
- e) Define appropriate comparison groups for observational studies.
- f) Compute and interpret odds ratios, relative risks, their confidence intervals and tests of significance using classical methods of analysis.

- g) Describe the concepts of confounding, effect modification (statistical interaction) and bias. Apply these concepts to describe the role of variables as potential confounders or effect modifiers. Describe and utilize appropriate methods of stratified analyses to account for the effects of confounding or effect modification.
- h) Recognize sources and types of bias from each type of epidemiologic study design and discuss their potential effects on the strength of observed associations.
- i) Evaluate associations based on causal inference.
- j) Read and interpret literature using epidemiologic and statistical methods.
- k) Discuss practical significance of findings from the epidemiologic literature.

#### IV. Teaching Format

New material will be presented in lectures. Homework assignments will be discussed in class as outlined below, and then handed in to the instructors. Because time in class is limited, students will be expected to read the assigned reading material prior to class and to be prepared to participate in class discussions.

#### V. Student Evaluation

- a) Homeworks and class participation – There are six homework assignments. All homework will first be discussed in class. Students are expected to come to class prepared to take part in the discussions as they will be called up randomly to describe their answers to the homework assignments. The assignments will be handed in to the instructor immediately following the discussion. If you cannot attend the class, student should email their answers to the instructor prior to the class in which it will be discussed. Each homework assignment and related class discussions will count towards 6% of your grade for a total of 30% – **only half the credit of the homework will be given to if it is handed in after the class in which it is discussed.**
- b) Examinations - there will be a midterm examination (30%) and a comprehensive final examination (40%). Make up examinations must be arranged in advance, and will only be permitted under extenuating circumstances.

#### VI. Textbooks

- a) Szklo M and Nieto FJ. Epidemiology Beyond the Basics. Second Edition. Aspen Publishers, Inc. Gaithersburg, MD 2006.
- b) Additional reading as assigned.

#### VII. Blackboard

The course management system, Blackboard, will be used to transmit and share all course materials including the syllabus, assignments, and lecture presentations.

#### VIII. Course Evaluation

The Programs in Public Health administer web-based course evaluations to students for each course near the end of the quarter. ***Your completion of both the unit (course) and faculty evaluation components is required; failure to complete either of the evaluations will result in an incomplete grade until the evaluations are submitted.*** You will be sent the web link and instructions via email later in the quarter. You will have about two weeks time to complete the evaluations before grades are submitted.

**Intermediate Epidemiology**

*Although at this point, life appears to be the most important predictor of eventual death, many questions remain!*

*(TB Newman, AJPB 1988)*

<b>Session</b>	<b>Date</b>	<b>Format</b>	<b>Topic</b>	<b>Readings</b>
1	Wed 1/3	Lecture	<b>Where we are and where we are going!</b> <ul style="list-style-type: none"> <li>- Review course syllabus, expectations</li> <li>- Review of basic study designs</li> <li>- Causal inference</li> </ul>	<b>Szklo &amp; Nieto:</b> Chapter 1 pp 3-43 <b>Rothman/Greenland</b> Chapter 1 pp 3-28
2	Mon 1/8	Lecture	<b>Principals of measurement: disease</b> <ul style="list-style-type: none"> <li>- Outcome definition</li> <li>- Disease frequency</li> <li>- Standardization</li> </ul>	<b>Szklo &amp; Nieto:</b> Chapter 2 pp 47-76
3	Wed 1/10	Lecture	<b>Introduction to cohort studies</b> <ul style="list-style-type: none"> <li>- Issues of study design</li> </ul>	<b>Epi Reviews Vol</b> 20(1), 1998; pp 57-70, pp 81-90, pp 91-99.
4	Mon 1/15	Lecture	<b>Cohort studies</b> <ul style="list-style-type: none"> <li>- Univariate measures of association relative risk</li> <li>- Confidence intervals</li> <li>- Tests of significance</li> </ul>	<b>Szklo &amp; Nieto:</b> Chapter 3 pp 77-105 Appendix A2 Appendia A3
5	Wed 1/17	Discussion	<b>Homework</b>	
6	Mon 1/22	Lecture	<b>Intro to case-control studies</b> <ul style="list-style-type: none"> <li>- Issues of design and methods</li> <li>- Selecting cases and controls</li> </ul>	<b>Wacholder S. et al.</b> Selection of controls in case-control studies. I. Principles. <i>Am J</i> <i>Epidemiol.</i> 135:1019- 28, 1992. <b>Wacholder S. et al.</b> Selection of controls in case-control studies. II. Types of controls. <i>Am J</i> <i>Epidemiol.</i> 135:1029- 41, 1992. <b>Wacholder S. et al.</b> Selection of controls in case-control studies.

III. Design options.  
*Am J Epidemiol.*  
 135:1042-50, 1992.

7	Wed 1/24	Lecture	<b>Case-control studies</b> - Univariate measures of association relative risk - Confidence intervals - Tests of significance	<b>Szklo &amp; Nieto:</b> Chapter 3 pp 77-105 Appendix A.4
8	Mon 1/29	Discussion	<b>Homework</b>	
9	Wed 1/31	Lecture	<b>Cross-sectional studies</b> - population vs. clinic based - descriptive statistics - univariate measures of association  <b>Compare the strengths and weaknesses of various study designs</b>	<b>Kelsey, 1996</b> Chapter 10 pp 245-267
10	Mon 2/5	EXAM	<b>Midterm examination</b>	
11	Wed 2/7	Lecture	<b>Sources of error</b> - Differential vs. non-differential <b>Biases in study design</b> - Types of bias - Examples and affects on strength of associations	<b>Szklo &amp; Nieto:</b> Chapter 4 pp 109-150 <b>Sackett DL,</b> Bias in analytic research. <i>J Chronic Disease</i> 1979;32:51-63
12	Mon 2/12	Discussion	<b>Homework</b>	
13	Wed 2/14	Lecture	<b>Identifying noncausal associations:</b> Confounding	<b>Szklo &amp; Nieto:</b> Chapter 5 pp 151-182
14	Mon 2/19	Lecture	<b>Defining/assessing heterogeneity of effects:</b> Interaction	<b>Szklo &amp; Nieto:</b> Chapter 6 pp 183-223 Appendix C
15	Wed 2/21	Lecture	<b>Stratification and Adjustment</b>	<b>Szklo &amp; Nieto:</b> Chapter 7 pp 227-295
16	Mon 2/26	Discussion	<b>Homework</b>	
17	Wed 2/28	Lecture	<b>Principals of measurement: exposure</b> - Validity and reliability - Asking the right question - Biomarkers - Kappa and percent agreement	<b>Szklo &amp; Nieto:</b> Chapter 8 pp 297-349

18 Mon 3/5 Discussion **Homework**

19 Wed 3/7 Lecture **Other issues**

- Genetic epidemiology
- Social epidemiology
- Communicating results.
- Presenting results

**Szklo & Nieto:**

Chapter 9 pp 353-374

**Larson**

*Circulation*.2006; 114:  
76-81. Descriptive  
Statistics and Graphical  
Displays

20 Mon 3/12 EXAM **Comprehensive Final Examination**

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