COURSE SYLLABUS

PH 792: Fundamentals of Clinical Epidemiology (3 units)

PREREQUISITE:

PH 664 (Principles of Epidemiology II) or consent of instructor.

TIME and PLACE:

Wednesdays 2:00 p.m. -- 4:50 p.m. in Biomedical Sciences Building, Room D211

INSTRUCTOR:

Eric L. Hurwitz, DC, PhD
Associate Professor, Department of Public Health Sciences and Epidemiology
Biomedical Sciences Building, Room D104H

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OFFICE HOURS:

Tuesdays and Thursdays 2:00 -- 4:00 p.m. and by appointment, Biomed D104H

DESCRIPTION:

Combined lecture-discussion course on health measurement and the use of epidemiologic principles to questions applicable at both the individual and population levels on diagnosis, screening, prognosis, and the safety and efficacy of therapeutic and preventive interventions.

FORMAT:

Lectures, discussions, exercises, critiques of the current literature, and quizzes.

REQUIREMENTS:

Weekly readings, multiple sets of exercises and short quizzes, a project (with presentation to the class), and a final (cumulative) quiz.

OBJECTIVES:

1. To learn how to apply epidemiologic principles to clinical situations.

2. To learn and apply measures of diagnostic accuracy and the use of Bayes= theorem and likelihood ratios in single and sequential testing.

3. To learn the statistical considerations pertinent to screening, screening criteria, potential biases, and the advantages and disadvantages of screening.

4. To learn about the natural history of illness and its implications to screening, diagnosis, prognosis, and therapy.

5. To learn the theoretical and technical issues of health measurement and their application to specific areas of health-status and quality of life assessment.

6. To learn the methods used in evaluating the safety and efficacy of therapeutic and preventive interventions, and the balance of risks and benefits from the individual and population perspectives.

7. To learn the tools and the statistical and ethical issues involved in health outcomes research.

8. To use the methods of clinical epidemiology to answer specific research questions about diagnosis, screening, prognosis, and therapy.

PRIMARY TEXT:

Weiss NS. *Clinical Epidemiology: The Study of the Outcome of Illness*. New York: Oxford University Press, Inc., 2006.

ADDITIONAL TEXTS:

Haynes RB, Guyatt G, Sackett DL, Tugwell P. *Clinical Epidemiology: A Basic Science for Answering Questions about Health Care*. Philadelphia: Lippincott Williams and Wilkins, 2005.

Katz DL. *Clinical Epidemiology and Evidence-Based Medicine: Fundamental Principles of Clinical Reasoning and Research*. Thousand Oaks, CA: Sage Publications, Inc., 2001.

SCHEDULE AND CLASS TOPICS:

Date	Topic
August 22	Introduction: course objectives and requirements, the nature of clinical epidemiology, what it is and how it is used
August 29	Diagnosis: the "gold standard", concepts of reliability and validity of diagnostic tests; discussion of exercise set 1
September 5	Diagnosis: sensitivity, specificity, likelihood ratios, and ROC curves, and how these measures are related; Quiz 1
September 12	Diagnosis: predictive value and Bayes' theorem, odds and probabilities, implications of Bayes' theorem, conceptual factors influencing probability estimates, Bayes' theorem and sequence of testing
September 19	Screening: definitions, criteria, statistical considerations pertinent to screening; discussion of exercise set 2
September 26	Screening: sequential testing, consideration of monetary and human costs, potential biases, screening advantages and disadvantages; Quiz 2
October 3	Prognosis: natural history of illness and its relevance to clinical epidemiology
October 10	Prognosis: health status measurement, theoretical and technical issues of health assessment and implications in inference from population-based studies; discussion of exercise set 3

SCHEDULE AND CLASS TOPICS (continued):

Date	Topic
October 17	Prognosis: introduction to measures used for assessing specific dimensions of health, e.g., physical disability, social health, psychological well-being, anxiety and depression, pain; Quiz 3
October 24	Prognosis: measurement of general health status and quality of life
October 31	Therapy: randomized clinical trials and observational studies used to evaluate the safety and efficacy of preventive and therapeutic interventions; discussion of exercise set 4
November 7	Therapy: introduction to pharmacoepidemiology and the balance of risks and benefits; Quiz 4
November 14	Therapy: introduction to the methods of health outcomes research, including meta-analysis, cost-effectiveness analysis, and decision analysis
November 21	Therapy: discussion of statistical and ethical issues involved in health outcomes research; discussion of exercise set 5
November 28	Application: student presentations of their projects on applying the principles of clinical epidemiology to answer specific questions relevant to diagnosis, screening, prognosis, or therapy
December 5	Final quiz (cumulative with emphasis on material not included on prior quizzes)

READING ASSIGNMENTS:

Required readings from the primary text and from the current literature will be assigned and critiqued weekly.

PROJECT:

Each student will be responsible for (1) identifying a research question relevant to diagnosis, screening, prognosis, or to disease prevention or treatment, (2) designing a protocol to answer this question, and (3) leading a class discussion about the question and protocol.

STUDENT EVALUATION:

1.	Exercise sets (5 @ 4% each)	20%
2.	Quizzes (4 @ 5% each)	20%
3.	Project and presentation	30%
4.	Final quiz	30%

GRADING SCALE:

A+	=	97-100%
A	=	93-96%
A-	=	90-92%
B+	=	87-89%
B	=	83-86%
B-	=	80-82%
C+	=	77-79%
C	=	73-76%
C-	=	70-72%
D+	=	67-69%
D	=	63-66%
D-	=	60-62%
F	=	<60%

COMPETENCIES ADDRESSED:

MPH core competencies:

Analytic Skills (AS)

- AS1 Define a public health problem.
- AS2 Determine appropriate use of data and statistical methods.
- AS3 Collect and summarize data relevant to an issue.
- AS4 Evaluate the quality and comparability of data and identify gaps in data sources.
- AS5 Describe how data illuminate ethical, political, scientific, economic, and overall public health issues.
- AS6 Identify research designs used in public health, including advantages and flaws of specific designs, and determine designs appropriate to specific needs.

Cultural Skills (CS)

- CS1 Interact sensitively, effectively and professionally with persons from diverse cultural, socioeconomic and professional backgrounds.
- CS2 Identify the role of cultural, social, and behavioral factors in determining disease, disease prevention, health-promoting behavior, and medical service organizations and delivery.
- CS3 Develop and adapt approaches to problems that take into account cultural differences.

Basic Public Health Skills (PHS)

- PHS1 Define, assess, and describe the health status of populations, determinants of health and illness, factors contributing to health promotion and disease prevention and factors influencing the use of health services.
- PHS2 Apply the basic public health skills from behavioral and social sciences, biostatistics, epidemiology, and environmental health to design/evaluate programs/policies to improve health.

Specialization (epidemiology) competencies:

Epidemiology MPH Competencies

- E1. Identify the epidemiological dimensions of the major causes of morbidity and mortality regionally, nationally and internationally with particular emphasis on chronic and infectious disease.
- E2. Identify public health practices for disease control including surveillance, screening, and outbreak investigation.
- E3. Identify practices for disease detection including the use of biomarkers, and molecular biology.
- E4. Demonstrate proficiency in computer based data collection, management, and analysis using major statistical software and fundamental strategies for biostatistical analysis.
- E5. Apply appropriate statistical tests for parametric and non-parametric settings and identify advanced statistical methods for analyzing both nominal and continuous data, for both univariate and multivariate applications.
- E6. Demonstrate skills in the conduct of epidemiologic research:
  a. Critically assess epidemiologic data and literature.
  b. Write an epidemiologic research proposal.
  c. Devise sampling protocols and design questionnaires.
  d. Develop a plan for survey logistics and data quality control.
  e. Evaluate, interpret and discuss research results in the format required for an epidemiologic research report.