

University of Arkansas for Medical Sciences
Fay W. Boozman College of Public Health

Department of Epidemiology

Spring 2012

PBHL 5173 - Epidemiology I

Thursday, 5:30 – 8:30 pm
COPH 8th floor auditorium

Course Syllabus

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PBHL 5173 - Epidemiology I Spring 2012

Course Description

This is an introductory course that focuses on the basic principles and methods of epidemiologic research and practice. It presents an overview of the history and theoretical basis of epidemiology, measures of morbidity and mortality, disease transmission and risk, major epidemiologic study designs, measures of association, sources of error including bias, confounding and interaction, evaluation of screening tests, inference and causality. The course will provide an overview of how epidemiology is used to accomplish the following tasks vital to public health:

1. Describe the natural history and prognosis of diseases
2. Assess the extent and importance of diseases in public health
3. Identify the cause or etiology of disease (identify risk factors)
4. Evaluate effectiveness of disease prevention measures and of healthcare
5. Provide the foundation for public health policy development

Prerequisites

No prior experience or courses relating to epidemiology is assumed. Basic mathematical skills are necessary.

Required Text and Materials

- Introduction to Epidemiology by Ray M. Merrill, fifth edition. The textbook is available at the UAMS Book Store.
- A calculator. Students may not use graphing calculators, calculators with memory functions, or cell phone/PDA calculators on exams. Any basic calculator is fine; if you do not yet have one, a recommended model is Texas Instruments TI-30X IIS.
- Basic school supplies: pen or pencil, lined loose-leaf paper.

Recommended Text

- Principles of Epidemiology Workbook by Ray M. Merrill. This is bundled with the required textbook if you purchase it at the UAMS Book Store.

Teaching format

Students are expected to arrive in class on time, to have completed reading assignments, and to be prepared to discuss the textbook material. Regular in-class exercises will supplement learning activities. Credit for in-class exercises will most often be based upon effort; students will be told when an in-class exercise will be graded for accuracy. In-class exercises may not be made up and any absences will be reflected in the "Participation and in-class exercises" portion of the final grade.

Students are responsible for all materials distributed in class. Absent students may get copies of materials from other students, but the instructor will not facilitate such exchanges. Homework assignments will be posted on Blackboard (accessible at uams.blackboard.com).

Out of the classroom, students are responsible for reading the assigned chapters in the text book and completing homework assignments. Homework will be graded based upon the accuracy and quality of the work, not simply credited based upon completion or effort. Homework must be turned in at the beginning of the class period at which it is due. Students who anticipate missing a class when an assignment is due should make arrangements to turn it in ahead of time. No excuses are necessary for late assignments, but assignments that are turned in after the deadline will receive a 20% penalty for every 24-hour window that passes before the assignment is turned in. For example, a homework assignment worth 30 points will automatically be docked 6 points for each day it is late. If five days have passed since the deadline without the assignment being turned in, the grade for it is zero.

Exercises marked “Recommended/optional” are not required, but are recommended to check comprehension and study for exams. The instructor will not grade these exercises, but both the textbook and workbook include some answers in the back.

Examinations

There will be three in-class, closed-book tests, given in the UAMS classroom. Information covered in class, in handouts, and in the assigned chapters of the textbook is required and will be subject to testing unless otherwise specified.

If you anticipate missing class on the day of a scheduled exam due to extraordinary circumstances, notify the instructor as soon as possible. At the discretion of the instructor, such make-up exams may be allowed and will be given before the regularly scheduled exam. Unless extraordinary, unforeseeable circumstances cause the absence, not taking a test without prior consultation with the instructor will result in an automatic grade of zero for that exam. If you have such circumstances, you must provide a doctor’s note or similar justification.

Online Resources

Blackboard: The syllabus and homework assignments will be posted to the class Blackboard site, accessible at uams.blackboard.com. Assignments will not be accepted through Blackboard. The site should be considered a supplement to the course rather than a primary avenue of instruction.

Twitter: Students are encouraged but not required to participate in class conversations on Twitter, using the hashtag #pbh15173 to share reactions to the reading or lectures, to ask questions, etc. Course announcements and various items of interest will also be posted on Ms. Goodell’s Twitter page: twitter.com/MEGoodell. Items directly related to the course will be tagged #pbh15173.

Office Hours

No specific office hours will be kept. Individual appointments can be scheduled by contacting Ms. Goodell by email. Walk-ins are welcomed at your own risk.

Assignments and Grading

There are a total of 500 points possible in the course. Numerical scores will be determined by class participation, assignments, and examinations, assigned as follows:

Type of Assignment	Date / date due	Points
Participation and in-class exercises	Throughout semester	100
Homework	HW 1 due 2/02/12; HW 2 due 3/15/12; HW 3 due 4/26/12	100
Exam 1	2/16/12	100
Exam 2	4/05/12	100
Exam 3	5/10/12	100

The dates above are subject to change due to inclement weather or other unforeseen circumstances.

Final grades will be assigned in the following manner:

- A: 450 to 500 points (90 -100%)
- B: 400 to <450 pts (80 to <90%)
- C: 350 to <400 pts (70 to <80%)
- D: 300 to <350 pts (60 to <70%)
- F: <300 pts (<60%)

Grades will not be rounded (i.e., 449.5 points will be recorded as a B).

Grades of “Incomplete” (i.e., “I”) will be assigned only in exceptional circumstances and at the discretion of the instructor. Except in the case of serious illness/injury, advance approval of the instructor is required. In such cases, an agreement indicating a) required activities, b) dates for the completion of each activity, and c) consequence of not meeting deadlines for activity completion will be devised by the student and instructor and signed by both parties.

Extra Credit

Students who need or desire to earn additional points have the option of completing one or more extra credit exercises. Each activity is worth a maximum of 10 points toward your final grade and you may only complete each activity once (for a maximum of 30 extra points per student). Extra credit papers will be graded (i.e., those 10 points are not automatic just for turning it in) and the regular rules apply: write well, watch your spelling and grammar, no plagiarism.

Options for extra credit:

- Attend Grand Rounds at COPH or the Arkansas Dept. of Health, or a COPH Health Research, Policy, and Health Promotion Conference, and provide a 300-400 word summary of the key points and connections the presentation had to class. See http://www.uams.edu/coph/deans_office_monthly_calendar.asp for a schedule.

- Find an example of epidemiology in popular culture (movie, TV show, novel, artwork, etc). Write a 400-500 word paper critiquing its portrayal of epidemiology. For example: What did it get right? What did it get wrong? What message did it send about epidemiology? Etc.
- Research a historical outbreak, epidemic, or pandemic. (Sorry, you can't pick the Black Death of 1348, the Broad Street cholera outbreak of 1854, or the Spanish Flu of 1918.) Write a 400-500 word paper describing the event, including the pathogen and disease, responses to the event, and any lasting impact that the event had upon the fields of epidemiology, public health, or medicine. You must cite at least 3 scholarly sources (your textbook may be one of them).

Extra credit assignments must be turned in no later than May 3, 2012.

Miscellaneous

1. Students are strongly encouraged to take notes by hand due to the nature of the material. Taking notes with a laptop is allowed but not encouraged. If you use a laptop to take notes, you must sit in the back.
2. Cell phones and pagers must be off or set on silent/vibrate.
3. Students are responsible for turning in clickers at the end of every class period. If the clicker is not turned in, a fine may be assessed by Academic Computing.
4. Any disagreements about grading decisions must be submitted in writing and must include references from the textbook or lectures to support your position. Any disputes or grade-change requests are due to Ms. Goodell by email within 1 week of the date that the particular assignment was returned to students.
5. All email communication (changes in schedule, issues with online materials, answered questions, etc.) will be completed using the UAMS email address assigned to students. No alternative/personal email addresses (gmail, AOL, yahoo, etc.) will be used. It is the student's responsibility to check his/her UAMS email on a regular basis and particularly before class.
6. Ms. Goodell does not routinely check the messages feature on Blackboard. If you need to contact her, use her regular UAMS email (MEGoodell@uams.edu). For quickest response, include "Epi I" or "Epidemiology I" as part of the subject line.

Academic Calendar

The UAMS academic calendar, which lists important information for this and other classes (dates for class withdrawal, holidays, etc), is available online at <http://www.uams.edu/coph/students/academic%20calendar2011-2012.htm>.

College of Public Health Policies

Attendance: Students are expected to be diligent in the pursuit of their studies and in their class attendance. Students are requested to let the instructor know in advance (by email) if they are going to miss a class, especially if they are attending class in a remote location. Assignments are due regardless of class attendance/absence. Permission to make up work missed as a result of absence (such as quizzes) will be given at the discretion of the instructor.

Students with a disability: It is the policy of the UAMS College of Public Health to accommodate students with disabilities pursuant to federal law, state law, and the University's commitment to equal educational opportunities. Any student with a documented disability who needs accommodation should request to meet with the course instructor or the Associate Dean for Student and Academic Affairs no later than within the first 14 days (two weeks) following the first class meeting to develop an accommodation plan. Any student with a documented disability who determines later in the semester to seek accommodation or who develops a disability during the semester should refer to the procedures outlined in the college catalogue. Failure to follow these procedures may be construed as a waiver of student rights under the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990.

Academic Integrity and Plagiarism: Plagiarism is defined as adopting, appropriating for one's own use and/or incorporating in one's own work, without acknowledgement, passages, tables, photographs, models, figures, and illustrations from the writings or works of others; presenting parts of passages of other's writing as products of one's own mind. Any student who plagiarizes may be subject to receiving a zero on the written work and may be dismissed from the College of Public Health. All violations will be addressed according to the policies and procedures of the College of Public Health.

The College of Public Health subscribes to a web-based plagiarism detection and prevention system that is used by colleges and universities nationwide. The system works by scanning the student's document and matching the document against databases of texts, journals, electronic and web sources (including web sites that distribute or sell pre-written essays or term papers). Course instructors may, at their discretion, submit students' written work to the plagiarism detection system for the purpose of evaluating whether students have plagiarized.

Course Objectives for Epidemiology I

1. History and Role of Epidemiology in Public Health. Be able to describe the role of epidemiology in public health practice and research and be able to articulate the types of questions and problems that are amenable to epidemiologic investigation.
2. Sources of Public Health Data: Be able to list common sources of data for public health practice and describe the strengths and weaknesses of each type of data.
3. Measures of Disease. Be able to calculate, interpret, and communicate the following measures:
 - a. Incidence

- b. prevalence
 - c. Crude mortality rate
 - d. Age-, sex-, and cause-specific mortality rates
 - e. Mortality rates
 - i. Adjusted for age, or other characteristic by the direct and indirect method
 - ii. Infant mortality rate
 - f. Case-fatality rate
 - g. Proportionate mortality
 - h. Attack rate
 - i. Years of potential life lost
 - j. Excess risk
 - k. Relative risk (risk ratio)
 - l. Relative odds (odds ratio)
 - m. Attributable Risk
4. Crude vs adjusted rates. Understand when reporting of crude measures is and is not appropriate. Understand methods for controlling for confounding factors and effect modifiers. Be able to describe what information is needed in order to calculate direct and indirect adjustment as well as the appropriate context for each type of adjustment. Be able to calculate and communicate your results.
 5. Evaluation of Tests. Be able to define and, where appropriate, be able to calculate and communicate the following:
 - a. Validity
 - b. Reliability
 - c. Sensitivity
 - d. Specificity
 - e. Predictive power positive
 - f. Predictive power negative
 6. Epidemiologic Study Designs: Be able to recognize and describe major characteristics of epidemiologic study designs (including when each study type is most appropriate, relative strengths and weaknesses) and their applicability in public health practice or research.
 - a. Ecologic or correlation study
 - b. Case-comparison study
 - c. Cohort study
 - d. Cross-sectional study
 - e. Clinical trial (including stratification and blinding)
 7. Bias, Confounding and Effect Modification. Be able to define, recognize, and describe the importance of bias, confounding, and interaction or effect modification in epidemiologic studies. Be able to describe the most reasonable approach in epidemiologic studies for controlling for each effect.
 8. Error: Understand sources of error in epidemiologic studies and be able to define type I and type II error and the relationship between sample size and power in epidemiologic studies.
 9. Causality: Be able to describe the criteria for evaluating causality and apply them in epidemiologic studies.
 10. Screening Programs: Be able to describe the importance of screening programs and the criteria used to determine whether screening for a disease is appropriate or not. Be able to describe the types of biases that may exist for screening program evaluation.
 11. Critical Review of Epidemiologic Studies: Be able to summarize and critically review an epidemiologic article at a level appropriate for a beginning epidemiology student.
 12. Ethics in Epidemiologic Studies: Be able to define general ethical concepts and to describe important ethical issues related to epidemiologic studies.

13. Special Applications/Tools. Health Services Evaluation and Genetic/Molecular Epidemiology. Be able to describe measures of outcomes in health services and application of epidemiologic methods to the evaluation of success of public health interventions. Be able to describe how genes may contribute to disease and the major study designs for evaluating genetic contributions.

Relating Epidemiology I Course Objectives to Core COPH and Departmental Objectives

The COPH and Departmental Objectives (see list) are addressed, at least partially, as follows:

COPH Core Objective 2: Course Objective 5.

COPH Core Objective 8: Course Objectives 1-4, and 6-9.

Departmental Objective 1: Course Objective 9.

Departmental Objective 8: Course Objective 1.

Departmental Objectives 11-13: Course Objective 2.

Core COPH Objectives

1. Define the components of community-based public health practice.
2. Describe basic and contemporary issues of public health, including tools of community-based health assessment, surveillance, health promotion, disease prevention, policy, cultural competency, and ethics.
3. Demonstrate the ability to complete descriptive analyses as well as nonparametric, regression, multiple comparisons of means and analysis of variance for one- and two-factor experiment biostatistics for datasets.
4. Demonstrate an understanding of core statistical concepts, including database principles, basic probability principles, diagnostic test statistics, tests of hypotheses, sample-size estimation, and power of tests.
5. Describe the elements of the common chemical, physical, and biological hazards in the occupational and community settings, along with the ways in which these hazards are evaluated, controlled, and regulated.
6. Define the major components of at least two models of health behavior change, i.e., the Health Belief Model, Transtheoretical Model, Social Cognitive Theory.
7. Describe the organizational arrangements, financing, health status issues, health insurance, health manpower, cost of health care, quality of health care, access and regulatory issues of the health care delivery system in the United States.
8. Describe the core concepts of epidemiology, including its history and theoretical basis; measures of morbidity, mortality, disease transmission and risk; major study designs; measures of association; bias, confounding and interaction; evaluation of screening tests; inference; and causality.

Departmental Objectives

Technical Skills

1. Read, interpret, and critically evaluate the scientific literature (encompasses measures of risk, measures of association, research designs, hypothesis development and testing, assessment of bias, causality and inference).

2. Design and develop procedures and materials for implementing an epidemiologic study in the field.
3. Select and interpret the results of standard univariate and multivariate statistical techniques.
4. Carry out statistical analyses using common statistical techniques.
5. Develop databases using commonly available software.
6. Calculate sample size for standard research designs.
7. Demonstrate facility in the use of common statistical software, e.g., SAS and EpiInfo.
8. Describe the purpose, history, and use of epidemiology and epidemiologic methods.
9. Describe the current state-of-the-art and gaps in knowledge related to the area of epidemiologic interest.

Communication Skills

1. Review and synthesize relevant scientific literature.
2. Prepare, present, and communicate epidemiologic and other scientific information effectively to a broad range of scientific audiences, orally and in writing (includes technical reports and slide presentations).
3. Prepare, present, and communicate epidemiologic and other scientific information effectively to administrative audiences, orally and in writing.
4. Prepare, present, and communicate epidemiologic and other scientific information effectively to a broad range of community audiences (e.g., community, legislative, and advocacy groups), orally and in writing.

Organizational, Management, And Leadership Skills

1. Describe the organizational and team structures needed to carry out epidemiologic research and public health activities (community-based outbreak investigations, needs assessments, preventive interventions).
2. Collaborate in implementation of an epidemiologic research study.
3. Collaborate in implementation of public health activities and interventions.