

**PHC 6001 (Sections 8354 and 8366) PRINCIPLES OF EPIDEMIOLOGY
SUMMER C SEMESTER 2007**

Dates: 5/14/07 – 8/10/07

Place: Online via WebCT, <http://lss.at.ufl.edu>

**Instructor and Lecturer: Nabih R. Asal, Ph.D., F.A.C.E.; Professor of Epidemiology,
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DATE	LECTURE	TOPICS TO BE PRESENTED/DISCUSSED
5/15/07	1	<ul style="list-style-type: none"> • Introduction to Course • Epidemiology/Science of Public Health • Basic Terminology/ Epidemiologic Method
Assignments for Lecture 1: <ul style="list-style-type: none"> • Reading : Gordis: Chapter I pp 3-14 • Lecture: view Lecture 1, part 1 & 2 • Exercise 1 - Categorizing Study Designs Set 1 – Due Date 5/21/07 • Discussion Board: Getting Acquainted discussion posting • Discussion Board: Module 1 Discussion Board – conversation about the study designs/ Which one was difficult and why? 		
5/22/07	2	<ul style="list-style-type: none"> • Descriptive Epidemiology Person, place, and time
Assignments for Lecture 2: <ul style="list-style-type: none"> • Reading: Gordis: Chapters II & III p p 15-47 • Lecture: view Lecture 2, part 1 & 2 • Exercise 2: Categorizing Study Designs Set 2 – Due Date 5/28/07 • Discussion Board: Module 2 – Conversation about the study designs/ Which one was difficult and why? 		
5/29/07	3	<ul style="list-style-type: none"> • Vital Statistics • Sources of Data for Epidemiology
	4	<ul style="list-style-type: none"> • Classification of Disease • Certification of Cause of Death
Assignments for Lecture 3 & 4: <ul style="list-style-type: none"> • Reading: Gordis: Chapter IV, pp 58-60 • Lecture: view Lecture 3 and Lecture 4 • Exercise 3: Demographic characteristics – Due Date 6/4/07 • Discussion Board: Module 3, on demographic exercise – What was significant? • Exercise 4: Cause of death and proper completion of death certificate – Due Date 6/4/07 • Discussion Board: Module 4, General Q & A on death certificate 		

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6/5/07	5	<ul style="list-style-type: none"> Measures of Disease Frequency rates, ratios, proportions
	6	<ul style="list-style-type: none"> Rate Adjustment: Direct & Indirect Methods
<p>Assignments for Lectures 5 & 6:</p> <ul style="list-style-type: none"> Readings: Gordis: Chapters III & IV, pp 32-70 Lecture: view Lecture 5, parts 1 & 2, and Lecture 6, parts 1 & 2 Exercise 5: Measures of Disease Frequency: Rates, Ratios and Proportions – Due Date 6/11/07 Discussion: Module 5 – no discussion board, use 6 for general material questions Exercise 6: Age-Adjustment Exercise - - Due Date 6/11/07 Discussion: Module 6 - Interpreting Rate Adjustment Method 		
6/12/07	7	<ul style="list-style-type: none"> Investigation of Infectious Disease Outbreaks
	8	<ul style="list-style-type: none"> Outbreak Epidemiology
<p>Assignments for Lectures 7 & 8:</p> <ul style="list-style-type: none"> Reading: Gordis: Chapter II pp 15-31 Lecture: view Lecture 7, parts 1 & 2, and Lecture 8, parts 1 & 2 Exercise 7: Oswego – An Outbreak - Due Date for Ex. 7 or 8, 6/18/07 Discussion: Module 7 – Outbreak investigations Exercise 8: Outbreak 2 Botulism in Argentina - Due Date for Ex. 7 or 8, 6/18/07 Discussion: Module 8 - Discussion Outbreak Investigation Topics YOU MAY COMPLETE EXERCISE 7 OR EXERCISE 8. Students may choose which of these two exercises to do, with a slight recommendation to do Oswego, #7. 		
6/19/07-6/25/07		<ul style="list-style-type: none"> Examination I
6/26/07-7/2/07		<ul style="list-style-type: none"> SUMMER BREAK
7/3/07	9	<ul style="list-style-type: none"> Study Design in Epidemiology Overview-ecologic, cross-sectional studies
	10	<ul style="list-style-type: none"> Study Design in Epidemiology I Case-Control Studies
<p>Assignments for Lectures 9 & 10:</p> <ul style="list-style-type: none"> Reading: Gordis: Chapter 10, pp 159-173; 173-176, Chapter 13, pp 159-173; 199-202 Lecture: view Lecture 9, parts 1 & 2 and Lecture 10, parts 1 & 2 No Exercise 9 Discussion: Module 9 - Cross-Sectional design Exercise 10: Case-Control Study ESRD (15 questions) - Due Date 7/9/07 Discussion: Module 10 - Study Designs in Epidemiology- Case-Control 		

7/10/07	11	<ul style="list-style-type: none"> • Study Design in Epidemiology II Cohort studies
<p>Assignments for Lecture 11:</p> <ul style="list-style-type: none"> • Readings: Gordis: pp 166-176 Gordis: Chapter 9 & 13, pp 149-158; 199-202 • Lecture: view Lecture 11, parts 1 & 2 • Exercise 11: Cohort Study Larynx Cancer - Due Date 7/16/07 • Discussion: Module 11 - Cohort Study design Larynx cancer 		
7/17/07	12	<ul style="list-style-type: none"> • Study Design in Epidemiology III • Experimental Studies/Randomized Trials
<p>Assignment for Lecture 12:</p> <ul style="list-style-type: none"> • Reading: Gordis: Chapter VII & VIII pp 115-129; 130-146 • Lecture: view Lecture 12, part 1 & 2 • Exercise 12: Experimental Study Design Randomized Controlled Trials (diet drug) - Due Date 7/23/07 • Discussion: Module 12 - Experimental RCT 		
7/24/07	13	<ul style="list-style-type: none"> • Measures of Association <ul style="list-style-type: none"> ○ Relative Risk, Risk Ratio ○ Relative Odds, Odds Ratio • Attributable Risk, Population Attributable Risk
	14	<ul style="list-style-type: none"> • Bias and Confounding in Epidemiologic Research
<p>Assignments for Lecture 13 and 14:</p> <ul style="list-style-type: none"> • Reading: Gordis: Chapters XI & XIV pp 177-190; 203-223, Gordis: Chapter XV pp 224-239 • Lecture: view Lecture 13, parts 1 & 2 and Lecture 14, parts 1 & 2 • Exercise 13: Measures of association Smoking Ex - Due Date 7/30/07 • Discussion: Module 13— Measures of Association • Exercise 14: Bias and confounding - Ovarian cancer – Due date 7/30/07 • Discussion: Module 14 - Bias and Confounding in Epidemiology 		
7/31/07	15	<ul style="list-style-type: none"> • Screening in Disease Detection <ul style="list-style-type: none"> ○ Sensitivity, Specificity ○ Predictive Value Positive/Negative ○ False Positive/False Negative

Assignments for Lecture 15:

- **Reading:** Gordis: Chapters V & XVIII pp 71-94;281-300
- **Lecture:** view Lecture 15, parts 1 & 2
- **Exercise 15:** Screening in the Detection of Disease – **Due Date 8/6/07**
- **Discussion:** Module 15 - Screening in Disease and General Review Questions

8/4/07 –
8/8/07

- **Examination II**
Course Evaluation by Students

Read also Chapters:

XII More on Risk: Estimating The Potential for Prevention, pp 191-198

**XVI Identifying the Roles of Genetic and Environmental Factors
In Disease Causation pp 240-262**

XVII Using Epidemiology to Evaluate Health Services pp 265-280

XIX Epidemiology and Public Policy pp 301-313

XX Ethical and Professional Issues in Epidemiology pp 314-324

Course Description: An introduction to epidemiology for students majoring in any aspect of the health sciences. The principles and methods of epidemiology investigation, both of infectious and non-infectious diseases are included.

Course Objectives:

1. General Objectives: The purpose of this course is to explain the place of epidemiology in the general health thinking and to communicate some understanding of the basic principles of epidemiology. Examples of the use of the principles of epidemiology will be presented so that the student will have sufficient understanding to apply such principles in future health work. It is hoped that the course will allow the student to critically read and evaluate his/her public health work using epidemiological principles. This course is not intended to present the epidemiological aspects of the major diseases.

2. Specific Objectives:

- a. Identify the major landmarks in the field of epidemiology.
- b. Define key epidemiology terms and know how they are used in the context of epidemiology.
- c. Know the basic concepts of epidemiology such as the multi factorial nature of

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- all diseases, the interaction of agent, host and environment and the chain of transmission and be able to describe, explain and defend these concepts.
- d. Discuss the phases/stages of the Epidemiologic Method and identify appropriate study designs used in each stage.
 - e. List the descriptive epidemiology variables used under each of the broad categories of person, place, and time and identify key data sources for descriptive epidemiology.
 - f. Explain the evolution of the International Classification of Disease System used in coding mortality and morbidity data and know the most recent revision currently in use.
 - g. Define each of the causes of death listed in the cause of death section of the certificate of death and know who is responsible of completing information on the certificate of death. Specifically, define the underlying cause of death counted in U.S. Vital Statistics.
 - h. Discuss how to calculate basic epidemiology measures such as rates, ratios, and proportions. Have knowledge of specific terms and formulae used in calculating morbidity measures such as incidence and prevalence rates and all types of mortality measures and rates presented in class. Know the appropriate use of numerator, denominator, and K values for each of the rates used in epidemiology.
 - i. Identify the formulae and methods used to calculate adjusted rates by the direct and indirect methods. Discuss how to interpret adjusted vs crude death rates. Know how the selection of a Standard Population influences the calculated adjusted rate produced.
 - j. Identify the steps used in an outbreak investigation. Know how to draw, label and interpret an epidemic curve. Discuss how to calculate attack rates, attack rate ratios. Be familiar with the Line Listing used in outbreak investigation.
 - k. Understand and know the methods used in epidemiologic investigation such as reporting and surveillance, surveys, descriptive, cross-sectional, case-control (retrospective), cohort (prospective), and experimental (quasi experimental, randomized controlled trials, and community intervention studies) studies and outbreak investigation. Discuss how to design each kind of study, and how to analyze and interpret the data. Discuss the advantages and disadvantages of each type of study design.
 - l. Describe the anatomy of the epidemiologic study design and be able to explain and defend the approach to sampling for each of the studies. Design appropriate descriptive and analytical epidemiologic study designs.
 - m. Identify and discuss the three types of associations likely to be produced when examining the relationship between exposures and outcomes, the difficulty encountered, and criteria required in sifting causal association from indirect and spurious associations. Draw appropriate inferences from epidemiologic data and differentiate causal from non-causal inference.
 - n. Discuss how to calculate and interpret measures of association such as relative risk (risk ratio), odds ratio (relative odds), attributable risk and population attributable risk.
 - o. Identify the limitations of morbidity and mortality data; the distortion produced by confounding factors; and the weaknesses of prevalence and cause-specific mortality when used as substitutes for incidence.

- p. Identify and be able to describe, explain, and defend the major sources of error and bias in epidemiological data especially in retrospective and prospective studies. The awareness should be adequate to enable the student to recognize these problems in the literature and reserve judgment about conclusions reached.
- q. Identify basic principles and limits of public health screening programs. Define and calculate measures used in screening and early detection of disease such as reliability, validity, sensitivity and specificity, predictive value positive and negative.
- r. Evaluate strengths and limits of epidemiology reports and have some understanding of the uses of epidemiology in health policy and clinical decision making.
- s. Draw appropriate inferences from epidemiologic data.
- t. Communicate epidemiology to lay and professional audiences.
- u. Incorporate ethical and legal principles for data collection, maintenance, use, and dissemination.
- v. Recognize and use appropriate basic infectious and chronic disease methods and data.
- w. Choose appropriate epidemiologic measures.
- y. Become aware of current epidemiologic and public health problems.

Conduct of Course:

1. **Lecture-** for general orientation.

2. **Reading-** Teaching will generally follow the recommended textbook- Gordis, "Epidemiology," 2004, Updated Third Edition; however, additional textbooks of epidemiology are recommended to supplement the lectures.

3. **Examinations:** Students are expected to take the examinations on the scheduled date and time. Make up examinations are not allowed except under very unusual and convincing circumstances. Students who fail to take the examinations on the scheduled date and time period without a written permission of the instructor will receive a grade of F on the examination. This policy will be strictly enforced.

There will be two (two hour) examinations. Each examination will count 40% of the grade for a total of 80% of the Final course grade. Exams will be administered on WebCT within a Lock-Down Browser.

4. **Assignments:** Assignments should be submitted on time via WebCT. Correct assignments will be part of 13% (1% per assignment) of the Final course grade. Assignments for each lecture must be submitted prior to the next lecture being available to access. For example, you will not be able to access Lecture 3 until the assignment for Lecture 2 has been submitted. All assignments may be completed in teams of 2 students working together. Both students must submit the entire assignment via WebCT and the partners must be identified in the assignment. Please include your name(s), and the assignment name within your Word document submission.

5. Discussion Boards: Discussion boards are designed for discussion on specific topics. Each lecture will have a dedicated discussion board to discuss the material and assignments for that lecture. Participation will comprise 7% of your course grade. There are also a general discussion board, introductory discussion board and boards to discuss the exams.

6. Grades: The Grading scale for this course consists of the standard scale below:
A = 90% -100%, B+ = 84.9%- 89.9%, B = 80%- 84.9%, C+ = 75%-79.9%, C = 70-74.9,
D+ = 65% -69.9%, D = 60%-64.9%, E = Below 60.9%

Grades are comprised of:

- Assignments = 13%
- Discussion Board participation = 7%
- Exam I = 40%
- Exam II = 40%

Counseling Resources: Counseling Center, UF, 301 Peabody Hall, 392-1575
www.counsel.ufl.edu . Student Mental Health Services, UF, 392-1171
www.health.ufl.edu/schcc/smhs.htm (24-hour phone consultation)

7. Recommended Text:

Leon Gordis, "Epidemiology", 2004, Updated Third Edition;
W. B. Saunders Company, Philadelphia.

Purchase of textbook is required. It is strongly recommended that you read all of the assigned required readings. Use the index to read up on topics covered in class, preferably before each class lecture.

Additional readings can be found from the list of other books and special readings assigned by the instructor(s).

8. Requirements: Students are responsible for all course material, including reading all required materials prior to each lecture. The course is conducted in WebCT and all assignments, course lectures, discussion, emails and exams will delivered in this medium. Students will be required to download a Lock-Down Browser prior to taking the exams for this course and exams will be administered in this browser only.

9. Academic Integrity: Each student is bound by the academic honesty guidelines of the University and the student conduct code printed in the Student Guide and on the University website. The Honor Code states: "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity." Cheating or plagiarism in any form is unacceptable and inexcusable behavior.

11. Readings and Discussions: Students should read the assigned readings prior to viewing course lectures and be prepared to discuss the material on course discussion boards.

12. Policy on Make-Up Work: Students are allowed to make up work ONLY as the result of illness or other unanticipated circumstances warranting a medical excuse and resulting in the student missing a homework or project deadline, consistent with

College policy. Documentation from a health care provider is required. Work missed for any other reason will receive a grade of zero.

13. Accommodations for Students with Disabilities: Students requiring accommodations must first register with the Dean of Students' Office. The Dean of Students' Office will provide documentation to the student who must then provide this documentation to the faculty member when requesting accommodation. The College is committed to providing reasonable accommodations to assist students in their coursework. We all learn differently: however, if you have experienced problems in university classes with writing, exams, understanding or concentrating on course material, please talk to me or access a learning or education testing resource at the University or in another professional setting.

Definitions

Many definitions of Epidemiology in dictionaries, medical dictionaries, public health texts, and epidemiology texts.

Simply -- "The study of the occurrence and distribution of health and disease in groups."

May be looked upon as the "Diagnostic Discipline of Public Health" or the "Basic Science of Public Health".

Derived from 3 Greek Words - EPI - down, on, upon, (EPIdermis, the outer layer of the skin).DEMOS - people (DEMOcracy, government by the people. LOGY - study, knowledge (psychology study of the mind.

Therefore, by its derivation, Epidemiology is not confined to community disease. It is literally "The study of anything which descends upon the people."

What Is Epidemiology?

- 1. "Epidemiology is the study of the distribution and determinants of disease prevalence in man." MacMahon, B., and Pugh, T.F., Epidemiology Principles and Methods.**
- 2. "Epidemiology may be defined as the study of the determinants of the incidence and prevalence of disease." Alderson, M., An Introduction to Epidemiology.**
- 3. "Epidemiology is the study of disease occurrence in human populations. The primary units of concern are groups of persons, not separate individuals." Friedman, G.D., Primer of Epidemiology.**
- 4. "Epidemiology is the basic science of preventive medicine" because Epidemiology deals with problem solving, "Epidemiologic problems are concerned with explaining the occurrence of disease in human populations and with exploiting explanations discovered for development of methods to protect man against disease." Fox, J.P., Hall, C.E., and Elveback, L.R., Epidemiology Man and Disease.**
- 5. "Epidemiology is defined as the study of the factors determining the frequency and distribution of disease in human population." Lowe, C.R. and Kostrzewski, J., Epidemiology A Guide to Teaching Methods.**
- 6. "Epidemiology may be defined as the study of the distribution and determinants of diseases and injuries in human populations. That is, epidemiology is concerned with the frequencies and types of illnesses and injuries in groups of people and with the factors that influence their distribution." Mausner, J.S. and Kramer, S., Epidemiology An Introductory Text.**
- 7. "Epidemiology is defined as the study of the distribution and dynamics of disease in populations. Several words in this definition require elaboration. Distribution implies the selection of people for attack by a disease in relation to age, sex, race, occupational and social characteristics, place of residence, susceptibility, exposure to specific agents or whatever other characteristic is pertinent. Dynamics refers to the distribution in time and is concerned with trends, cyclic or secular patterns, and intervals between exposure to inciting factors and onset of disease." Sartwell, P.E. and Last, J.M., in John M. Last, Maxcy-Rosenau Public Health and Preventive Medicine.**
- 8. "Epidemiology is the study of the distribution and determinants of health-related states or events in specified populations, and the application of this study to control of health problems. There have been many definitions of epidemiology. In the past 50 years or so, the definition has broadened from concern with communicable disease epidemics to take in all phenomena related to health in populations."**

The Oxford English Dictionary gives as a definition: "That branch of medical science which treats of epidemics" and cites Parkin (1873) as a source. However, there was a "London Epidemiological Society" in the 1850s. The identity of the Scholar who first used the word at that time has been lost. Epidemiologia appears in the title of a spanish

history of epidemic, *Epidemiologia espanala*, Madrid, 1802.

Epidemic is much older. The word appears in Johnson's Dictionary (1775), and OED gives a citation dated 1603. The word was, of course, used by Hippocrates.

Last, J.M., *A Dictionary of Epidemiology*, Second Edition.

Community disease may be in any of 3 phases- ENDemic, EPIdemic, PANdemic.

Endemic: The habitual presence of a disease within a given geographic area.

Epidemic: Is the occurrence in a community or a region of a group of illnesses of similar nature, clearly in excess of normal expectancy (derived from a common or propagated source).

Pandemic: The world wide spread of epidemic disease.

Epizootic: Occurrence as an epidemic disease among animals.

Enzootic: Occurrence as an endemic disease among animals.

Zoonosis: Disease primarily of animals but transmitted to man.

Epiphytic: Occurrence as an epidemic disease among plants.