

**PH 7011 – Epidemiology for Public Health**

**Instructor's Name:** Ike S Okosun, MS, MPH, Ph.D, FRSPH, FTOS, FACE  
**Division:** Epidemiology and Biostatistics

**Fall Semester 2014**

<b>Course Basics</b>	<b>Class Day/Time:</b>	Wednesday / 1:00-3:30 pm
	<b>Class Location:</b>	Class Room South Room 107
	<b>Prerequisite(s):</b>	No prerequisites are required for the course.
	<b>Required Course Materials</b>	Introduction to Epidemiology by Ray M. Merrill, Jones & Bartlett Learning 6th edition SBN: 9781449665487
	<b>Optional Course Material</b>	Epidemiology by Leon Gordis, Saunders Elsevier ISBN 4th Edition 978-1-4160-4002-6

<b>Faculty Accessibility</b>	<b>Instructor</b>	Ike S Okosun, MS, MPH, Ph.D, FRSPH, FTOS, FACE
	<b>Teaching Assistant</b>	Francis Annor, MPH, PhD-Candidate
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	<b>Office Hours/Availability:</b>	Wednesdays 9 am – 12.45 pm & by Appointment

**1. Course Description:**

Epidemiology for Public Health is a core course in the MPH program. The course is designed to introduce students to the concepts of epidemiological methods and their practical applications in the understanding of determinants and distributions of health related events. The course will cover basic principles of epidemiology, including disease control and analysis of risk factors. Topics will include the history of epidemiology, types of epidemiologic studies, including cross-sectional, case-control, and cohort studies, and risk estimation and causal inferences. The course will demonstrate the interphase between epidemiology and policy development. Problem sets will provide experience in epidemiologic methods and inferences.

**I. Course Objectives / Competency / Assessment of Student Learning:**

**This course is designed to support students in acquiring competence in the following two areas, as indicated in the School of Public Health Graduate Student Handbook (see *MPH Core Competencies*).**

- Calculate and interpret common epidemiologic measures to draw appropriate inferences. (MPH Core Competency #4)
- Critically evaluate strengths and weaknesses of epidemiologic methods. (MPH Core Competency #5)

**MPH Competencies:** Students in the Master of Public Health program with a concentration in Epidemiology will be expected to demonstrate competence in the following areas:

EPID 1. Identify and discuss risk factors and their relationship to health outcomes.

EPID 2. Demonstrate proficiency in advanced epidemiologic methods.

EPID 3. Assess, synthesize and critically evaluate epidemiologic literature for strengths and weaknesses.

EPID 4. Identify key sources of data for epidemiologic purposes and their strengths and limitations.

EPID 5. Demonstrate proficiency in data analysis and appropriate interpretation of results.

EPID 6. Design, analyse, and evaluate an epidemiologic study.

EPID 7. Design and evaluate interventions to reduce prevalence of major public health problems.

EPID 8. Identify and discuss ethical dilemmas in epidemiologic research.

EPID 9. Explain policy implications of epidemiologic research findings.

<b>Course Objectives</b>	<b>Program Competency</b>	<b>Assessment Method(s)</b>
Demonstrate ability to calculate common epidemiological measures	<b>MPH Core 4</b>	Homework problems, group presentations, quizzes, and midterm examination
Demonstrate ability to draw appropriate conclusions	<b>MPH Core 4</b>	Homework problems, group presentations, quizzes, final examination
Demonstrate ability to critically evaluate strengths and weaknesses epidemiological study designs	<b>MPH Core 5</b>	Homework problems, group presentations, individual project complementary for the final examination
Demonstrate ability to assess biases in epidemiological studies	<b>MPH Core 4 and 5</b>	Homework problems, group presentations, individual project complementary for the final examination

## II. Course Assignments and Requirements

- a. Participation: This course assumes substantial and informed student participation. General discussion of epidemiological concept is encouraged. Class attendance and thoughtful participation are important and will be reflected in part in the final grade. Please notify the instructor of an absence before the class.
- b. Students will be responsible for materials in the text, handout, and assigned readings as well as materials covered in the class.
- c. Students will be expected to complete all homework and problem sets.
- d. Students must take the 2 exams as scheduled, no make-up exams are allowed (except illness with medical excuse from a licensed physician)
- e. No make up for quizzes

Course requirements will contribute to grade as follows:

In-class participation	10%
Midterm exam	30%
Weekly quiz	15%
Homework	15%
Final exam	30%

## III. Grading Policy

### Grading Scale:

- A: 90 – 100
- B: 80 – 89
- C: 70 – 79
- D: 60 – 69
- F: < 60

**Withdrawals:** A student who withdraws at any time up to the mid-point of the quarter will be assigned a W or WF depending upon whether he/she is doing satisfactory work at the time of withdrawal. An average grade of D or F at the time of withdrawal will be assigned a grade of WF. After the mid-point of the quarter, the Registrar's Office will assign an automatic WF to any student who withdraws from the course without a hardship withdrawal. If a student receives permission to withdraw under hardship, the Instructor will assign a W or WF grade depending upon the student's work up to the point of time that the student withdrew.

The following is the formal policy at Georgia State University:

Effective Fall 2001, Instructors must on a date after the mid-point of the course to be set by the Provost (or his designee),

1. give a WF to all those students who are on their rolls but no longer taking the class and
2. report the last day the student attended or turned in an assignment.

Students who are withdrawn may petition the department chair for reinstatement into their classes.

**Incompletes:** A student will be given the grade I only if nonacademic circumstances beyond the student's control prevent the student from completing a small segment of the course—e.g., the final examination. For a student to receive the grade of I, he/she must be doing satisfactory work (an average grade of C or better) up to the point that he/she could not continue. Arrangements must be made with Instructor to remove the incomplete grade within one quarter.

#### **IV. Attendance and Class Participation Policy**

Attendance is expected and will be reflected in part in the final grade.

#### **V. Late Assignments and Make-up Examination Policy**

- Make-up exams are not provided, except in hardship cases that should be discussed in advance with the Instructor.
- Any assignment turned in late is not graded.
- There is no scheduled make-up time for exams or paper presentations. If a student cannot take an exam or present at the scheduled time, they must consult with the Instructor on scheduling the make-up.

#### **VI. Syllabus Deviation Policy**

The course syllabus provides a general plan for the course; deviations may be necessary.

#### **VII. Student Code of Conduct and Policy on Academic Honesty**

All students at this University are expected to engage in academic pursuits on their own with complete honesty and integrity. Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action. The complete Academic Honesty policy is located in the GSU Graduate Catalog, Section 1350: <http://enrollment.gsu.edu/catalogs/>. Students and faculty are expected to review and conform to the university's policy on academic honesty. Information on the Student Code of Conduct and related policies and procedures are available at: <http://codeofconduct.gsu.edu/>.

Special attention should be paid to the sections on plagiarism and multiple submissions:

*Plagiarism.* Plagiarism is defined as, “*appropriating and putting forth as one's own the ideas, language, or designs of another*” (The Living Webster, 1975) – and it is strictly forbidden. Written and oral presentations must be a student's own work. Students plagiarizing or cheating in any form will face disciplinary action, which could result in an “F” in this course and suspension or expulsion from the University. Copying from written materials, presentations, websites, etc. without source acknowledgement and referencing is plagiarism. *Read it, appreciate it, learn from it, and make sure you source it – and then reflect it with your own thoughts and words!* If you are uncertain about what constitutes plagiarism, please contact the instructor.

*Multiple Submissions of the Same Material.* It is a violation of academic honesty to submit substantial portions of the same work for credit more than once without the explicit consent of the faculty member(s) to whom the material is submitted for additional credit. In cases in which there is a natural development of research or knowledge in a sequence of courses, use of prior work may be desirable, even required; however, the student is responsible for indicating in writing, as a part of such use, that the current work submitted for credit is cumulative in nature.

### **VIII. Disability Accommodations Policy**

Students who wish to request accommodation for a disability may do so by registering with the GSU Office of Disability Services. Students may only be accommodated upon issuance by the Office of Disability Services of a signed Accommodation Plan and are responsible for providing a copy of that plan to instructors of all classes in which an accommodation is sought. The Office of Disability Services is located in the GSU Student Center, Suite 230 and online here: <http://disability.gsu.edu/>.

### **IX. Course Evaluations Statement**

Your constructive assessment of this course plays an indispensable role in shaping education at Georgia State. Upon completing this course, please take time to fill out the online course evaluation.

### **X. Career Services**

The School of Public Health provides career services & student leadership opportunities (student clubs & organizations) to all current SPH students and alumni. SPH Career Services can help students with resume writing, interviewing, job searching, internship development, and professional networking. Students are invited to attend our career events and workshops, and individualized career counseling appointments can be arranged. To see what career panels, career fairs, and events are available this semester, please visit:

<http://publichealth.gsu.edu/students/career-resources/>.

The SPH Career Services office is co-located with the Office of Academic Assistance in room 640 at One Park Place.

### **XI. Additional Policies and Statements Communication**

**Students should check Desire2Learn at least every other day especially before driving or riding to GSU for this class.** The syllabus, any changes to the syllabus, lecture slides and homework will be posted to Desire2Learn. Should you have any questions about the course or its requirements, please ask your question during class or contact the Instructor directly by email. Students also may make an appointment to meet with the Instructor on class concerns. Should you wish to contact

the Instructor about your grades, please address them in writing or in person to the Instructor. Please do not use e-mail to communicate about grade concerns.

## **Syllabus**

**The course syllabus and schedule of topics provide a general plan for the course; deviations may be necessary.** Additional or substitute reading materials may be required and made available to students via handout or other means. In addition, as noted in the “Course Requirements” section above, students are expected to independently access and be familiar with health care issues and topics as presented in various media.

## **Copyright Policy**

For the purpose of copyright, students must adhere to the following rules:

- 1) Materials in the course reserves may only be accessed by a passcode or password by students enrolled in that course, and only for the semester of course enrollment
- 2) Students may not distribute copies of course reserves materials to other students**

## **Grade Point Average Requirements**

An overall grade point average (GPA) of 3.0 or better must be earned to receive the MPH degree. All core courses must be completed with a grade of B or better, and no more than six semester hours of grades less than B will be accepted for the degree. No grade below a C will be accepted toward the degree. Please refer to the Institute’s academic standing policy on Academic Warning and Suspension described in the Institute of Public Health section of the Graduate Catalog:

<http://catalog.gsu.edu/graduate20142015/institute-of-public-health/#program-and-degree-regulations>

## **XII. Tentative course contents, schedule, and readings**

### **Session 1-2 *Introduction to Epidemiology – The History and Scope***

#### **◆ Session Objectives:**

1. To distinguish between clinical medicine and public health
2. To distinguish between epidemiology and other public health specialties
3. To understand epidemiology as a scientific method
4. To understand epidemiology, its purpose, influences, and uses
5. To learn basis descriptive epidemiology an how they are presented
6. To learn basis descriptive epidemiology an how they are presented
7. To discuss morbidity and mortality
8. To discuss the ecological model – Triad
9. To define health promotion and disease prevention and how they apply to population-based practices

#### **◆ Session Concepts:**

- |                               |                               |
|-------------------------------|-------------------------------|
| ◆ Health                      | Agent                         |
| ◆ Disease                     | Host                          |
| ◆ Population                  | Environment                   |
| ◆ Risk Factors                | Vector                        |
| ◆ Health Promotion            | Clinical & subclinical stages |
| ◆ Disease Prevention          | Carrier                       |
| ◆ Population-Based Practices  | Immunity                      |
| ◆ Epidemiology                | Incubation period             |
| ◆ Objectives of Epidemiology  | Determinants of Health        |
| ◆ Epidemiology and Prevention | The Epidemiologic Approach    |

#### **◆ Session Methods and Materials:**

- ◆ Lecture and discussion of materials
- ◆ **Ray M. Merrill, (Chapter 1 & 2)**
- ◆ Gordis, Chapter 1 (pp. 3-17); Chapter 2 (pp. 19-36)

### **Session 3: *Selected Disease Concepts***

#### **◆ Session Objectives:**

1. To understand the natural history and origin of disease and sources of data associated with disease detection
2. To understand the spectrum of diseases and “the iceberg”
3. To discuss evolution of disease patterns from the 1900s to date
4. To recognize the components and modes of disease transmission
5. To distinguish between clinical and non-clinical disease
6. To compare definitions of ratios, rates, and proportions
7. To discuss ways of expressing morbidity and mortality
8. To differentiate between crude, adjusted, and specific rates.
9. To understand direct and indirect methods of age-adjustments to compare different populations.
10. To contrast mortality and morbidity, measures of each, and factors that affects each measure.

- ◆ **Session Concepts:**
  - ◆ Natural History of Disease Morbidity
  - ◆ Host, Agent, Environment Prevalence
  - ◆ Evolution of Disease Patterns (1900-2000) Incidence
  - ◆ Components of Disease Transmission Population at risk
  - ◆ Modes of Transmission
  - ◆ Ratio vs. Rates vs. Proportions
  - ◆ Ways of Expressing Prognosis
  - ◆ Three Levels of Rates (crude, adjusted, specific)
  - ◆ Types of adjustments
  - ◆ Mortality
  - ◆ Standardized Mortality Ratio (SMR)
  - ◆ Proportionate Mortality Ratio (PMR)
  - ◆ Specific Mortality Rates
  - ◆ Cause-Specific Mortality Rates
  - ◆ Measures of Mortality (annual mortality rate, case-fatality rate, proportionate mortality)
  - ◆ Measures of Morbidity (incidence, prevalence) and Problems with these Measures
  - ◆ Factors Affecting Prevalence
- ◆ **Session Methods and Materials:**
  - ◆ **Ray M. Merrill, (Chapter 3-4, Chapter 6)**
  - ◆ Gordis, Chapter 3 (pp. 37-57); Chapter 3 (pp. 59-84); Chapter 6 (pp. 109-112)

#### **Session 4: Sources of Data & Basic Epidemiologic Statistics**

- ◆ **Session Objectives:**
  1. To become familiar with the sources of epidemiologic, their strength and limitations
  2. To determine how to obtain various data sets
  3. Know how to use SPSS in descriptive epidemiology
- ◆ **Session Concepts:**
  - ◆ Census Data Descriptive Statistics
  - ◆ Vital Statistics Data Inferential statistics
  - ◆ Morbidity Data
  - ◆ Public Health Service Center for Disease Control
  - ◆ National Center for Health Statistics
  - ◆ Georgia Division of Public Health
  - ◆ Department of Human Resources
  - ◆ Private Sources of Data
- ◆ **Session Methods and Materials:**
  - ◆ Lecture and presentation
  - ◆ Websites and data sources
  - ◆ Gordis, Chapter 3 (pp. 37-57)

## Session 5

## *An Overview of Study Designs*

### ◆ **Session Objectives:**

1. To understand the design, purpose, and use Case study, Case-series and Ecological designs
2. To discuss subject selection, data collection, sample size, biases, result interpretations, and matching as these elements apply to basic research design
3. To understand the advantages and disadvantages of study designs and respective implications of each

### **Session Concepts:**

- ◆ Case and Case-series Studies
  - ◆ Purpose of Case and Case-series Studies
  - ◆ Strengths and Weaknesses of Case and Case-series Studies
- ◆ Cross-Sectional Studies
  - ◆ Purpose of a Cross-Sectional Study
  - ◆ Design of a Cross-Sectional Study
  - ◆ Establishment of Prevalence
  - ◆ Advantages/Disadvantages of Study Designs
- ◆ **Session Methods and Materials:**
  - ◆ **Ray M. Merrill, (Chapter 5, & 7)**
  - ◆ Gordis, Chapters 9-10 (pp. 195-198);

## Session 6-7

## **Study Designs**

### • **Session Objectives:**

1. To understand the design, purpose of case-control, cohort and experimental designs
2. To discuss subject selection, data collection, sample size, biases, result interpretations, and matching as these elements apply to basic research design
3. To understand the advantages and disadvantages of study designs and respective implications of each

### ◆ **Session Concepts:**

- ◆ Case-Control Studies
  - ◆ Purpose of a Case-Control Study
  - ◆ Design of a Case-Control Study
  - ◆ Selection of Cases and Controls
  - ◆ Matching
  - ◆ Problems of Recall
- ◆ Cohort Studies
  - ◆ Purpose of Cohort Studies
  - ◆ Design of a Cohort Study
  - ◆ Determining Incidence
  - ◆ Selection of Study Populations
  - ◆ Types of Cohort Studies
  - ◆ Potential Biases
  - ◆ When to Implement the Cohort Design
- ◆ Randomized Clinical Trials
  - ◆ Design of a Randomized Clinical Trial (RCT)

- ◆ Subject Selection
- ◆ Allocation of Subjects to Treatment Groups
- ◆ Data Collection on Subjects
- ◆ Necessary Considerations to Estimate Sample Size
- ◆ Other Considerations with RCTs
- ◆ Generalization of Results
- ◆ Gordis, Chapters 9-13 (pp. 167-226)
- ◆ **Session Methods and Materials:**
  - ◆ **Ray M. Merrill, (Chapter 7-8)**
  - ◆ Gordis, Chapters 9-10 (pp. 195-198);

## Session 7

## MIDTERM EXAM - October 15

### Session 8-10: Estimating Risks, Causal Inference

- ◆ **Session Objectives:**
  1. To define and contrast absolute risk, attributable risk, relative risk, and odds ratio
  2. To demonstrate the aforementioned measures by using a 2 X 2 table and appropriate formulas
  3. To calculate and interpret measures of risk
  4. To demonstrate appropriate use of each measure of risk.
  5. To understand the types of study designs that are conducive to the use of each measure of risk
  6. To become familiar with the principles of association and causation
  7. To understand evidence for a causal relation
  8. To know similarity of criminal law and epidemiologic determination of causation
- ◆ **Session Concepts:**
  - ◆ Absolute Risk
  - ◆ Association Between a Certain Disease and a Certain Exposure
  - ◆ Relative Risk
  - ◆ Relative Odds/Odds Ratio
  - ◆ Attributable Risk (exposed, non-exposed, total population)
  - ◆ Comparison of Relative Risk and Attributable Risk
  - ◆ Necessary Cause
  - ◆ Sufficient Cause
  - ◆ Direct Cause
  - ◆ Indirect Cause
  - ◆ Web of Causation
- ◆ **Session Methods and Materials:**
  - ◆ Lecture and discussion of materials
  - ◆ **Ray M. Merrill, (Chapter 9)**
  - ◆ Gordis, Chapters 9-15 (pp. 167-236)

### Session 11-12: *Assessing the Accuracy of Epidemiologic Studies*

#### **Session Objectives:**

1. To define sensitivity, specificity, and predictive value

2. To outline the relationship between sensitivity and specificity and variations in populations
3. To understand the uses of sequential and simultaneous testing
4. To discuss the predictive value of a test and how this measure relates to prevalence of disease and specificity
5. To understand the factors which affect the reliability of tests

**Session Concepts:**

- ◆ Biologic Variation of Human Populations
- ◆ Validity of Screening Tests
  - ◆ Tests with Dichotomous Results (positive or negative)
  - ◆ Tests of Continuous Variables
- ◆ Use of Multiple Tests
- ◆ Predictive Value of a Test
  - ◆ Relation of Predictive Value of Disease Prevalence
  - ◆ Relation of Predictive Value to the Specificity of the Test
- ◆ Reliability (Repeatability) of Tests
  - ◆ Intra-subject Variation
  - ◆ Inter-observer Variation
- ◆ Relation Between Validity and Reliability
- ◆ Ethics of Screening
- ◆ **Session Methods and Materials:**
  - ◆ Lecture and discussion of materials (emphasize handout notes)
  - ◆ **Ray M. Merrill, (Chapter 12)**
  - ◆ Gordis, Chapter 5 (pp. 85-108)

**Session 13: Other Applications of Epidemiology & Course Overview**

- ◆ **Session Objectives:**
  1. To determine what guidelines should be used to select appropriate outcome measures
  2. To assess similarities in etiologic epidemiologic research and health services research
  3. To understand the purposes of evaluating group and individual data and their associations with outcome research while noting potential biases
  4. To define and apply indices used to evaluate health services by using ecologic studies
  5. To review the **natural history of disease and the pattern of disease progression**
- ◆ **Session Concepts:**
  - ◆ Studies of Process and Outcomes
  - ◆ Efficacy, Effectiveness, and Efficiency
  - ◆ Measures of Outcomes
  - ◆ Comparison of Epidemiologic Studies of Disease Etiology and Epidemiologic Research Evaluating Effectiveness of Health Services
  - ◆ Evaluation Using Group Data
    - ◆ Outcomes Research
    - ◆ Potential Biases in Evaluating Health Services Using Group Data

- ◆ Two Indices Used in Ecologic Studies of Health Services (avoidable mortality and health indicators)
- ◆ **Session Methods and Materials:**
  - ◆ **Lecture and discussion of session materials**
  - ◆ **Ray M. Merrill, (Chapter 10-11; Pages 401-406)**
  - ◆ **Gordis, chapters 17 -20 (pp. 293-359)**

**FINAL EXAM – December 10, 2014 10.45 am – 1:15 pm**