EPIDEMIOLOGY IN PUBLIC HEALTH (Fall 2011)
Kinesiology and Health Sciences 385

Professor: Dr. Scott B. Ickes, Adair 114, x11902, sbickes@wm.edu

Course time & place: MWF 2:00-2:50pm, Morton 220

Course Description:
This course provides students with the introductory principles and conceptual tools of epidemiology. Students will be equipped to analyze events and controversies related to a wide range of contemporary public health issues in the US and global context using the critical lens of epidemiology. Basic principles of epidemiology and public health are illustrated via case studies of public health and biomedical interventions.

Course Objectives:
By the end of the course the student will be able to:

1. Define and distinguish core concepts and principles of epidemiology.
2. Use these concepts and principles to critically analyze empirical studies, including the methods, findings and interpretations.
3. Explain why caution is needed in drawing conclusions from a single study and when applying them to individuals or populations other than those included in the study.

By the end of the course the student will have acquired skills to:

- Construct and manipulate 2x2 contingency tables
- Assess the reliability and validity of diagnostic and screening tests
- Calculate both crude and adjusted morbidity and mortality rates
- Interpret life tables and Kaplan-Meier survival curves
- Calculate relative risks, attributable risks, and odds ratios
- Analyze critically the methodology of articles in the public health literature

Required textbook(s) and readings:

Gordis, L. (2009). Epidemiology 4th Edition. Philadelphia: Elsevier Saunders.

Additional readings, listed in your syllabus, will be posted on Blackboard under "Assignments."

Course Organization:
The primary structure of the course will be to have an interactive lecture on Mondays and Wednesdays, and in-class problem solving and discussion on Fridays. The first section of the course will cover key concepts in epidemiology, drawing heavily on the required textbook. The next section will examine the application of these concepts in case studies of specific diseases. Finally students will apply the core course concepts to develop and critique their own epidemiologic study. **Students are required to complete the assigned readings before all**

lectures, as they are fundamental for understanding lectures and participating in class discussions. The problem solving and discussion sessions on Fridays are intended to facilitate comprehension and integration of key concepts. **These sessions are critical for reinforcing and integrating your understanding of course material; attendance is required for these in the same manner as for lectures. Some of the quizzes will occur on Fridays.**

In addition to the above, the course will employ out-of-class assignments, quizzes and examinations as opportunities for students to demonstrate their understanding of the material and apply epidemiologic principles to the analysis of problems. Quizzes will be multiple choice and true/false; exams will include these as well as short answers. Exams will be cumulative, with emphasis on the more recent material for the 2nd midterm. The final exam will draw equally on material from the entire course. Cases will be used to illustrate key concepts. Exams will evaluate concepts elaborated by these cases, not trivial details of individual studies.

Blackboard:

Announcements, problem sets, lecture handouts, and supplementary materials will be available on Blackboard (KINE 385). Check in regularly to keep abreast of latest course information. Emails sent from Blackboard will default to your W&M email account.

In Course Documents: Syllabus, Schedule, lecture handouts.
In Assignments: Weekly postings, readings, focal questions.
In Grade book: Grades posted here
In Announcements: Occasional communications and reminders, via email

Student Evaluation

Your final grade in the course will include the components shown in the table below.

Assignment	Total Points	Weighting factor	Percentage of final grade
Midterm exam 1 (Sept 28: 2-2:50pm)	100	0.20	20
Midterm exam 2 (Nov 7: 2-2:50pm)	100	0.20	20
Final exam (Dec 12: 2-5pm)	100	0.30	30
Media assignment (Due Oct 26, 2pm)	10	0.10	10
Epidemiology study assignment (Due Nov 21, 2pm)	10	0.10	10
Quizzes (6, with lowest dropped = 5)	50	0.10	10

Grades will be assigned according to the table on p. 3. The course is offered for a letter grade only, not Pass/Fail. Grading changes will be rare. **If you request re-grading of a portion of an exam (even one question), the entire exam will be re-graded at the same time.**

Letter grade	Point spread
A A A-	90.0+ 92.0-97.9 90.0-91.9
B B+ B B-	80.0-89.9 88.0-89.9 82.0-87.9 80.0-81.9
C and D	Same strategy as above
F	<60

Midterm Examinations

The two mid-term exams will be given during a class period. A make-up examination is at the discretion of the instructor and may be provided for: (a) documented illness or (b) religious observances that occur *at the same time* as the examination.

Media Assignment

A major goal of this course is to enable you to listen and think critically about the conclusions drawn from epidemiologic studies. Not a day passes without hearing or reading such conclusions in the mass media. We will use such media reports as the basis for one of your out-of-class assignments. You will choose an article from the popular print media that deals with the relationships between some type of exposure (e.g., a food, drug, environmental chemical, a behavior, lifestyle, a stressor, etc) and a health outcome. You will then compare the reporting in that article to the reporting in the original scientific article upon which it is based. You will analyze the extent to which the conclusions are supported by the scientific paper and you will re-write a portion of the media article to bring it in greater alignment with the scientific paper. Guidance and an example for this assignment are available on the Blackboard site in "Course Documents". The media assignment will be worth 10 points. Five points will be deducted for an assignment turned in late. No assignments will be accepted beyond 24 hours of the deadline.

Epidemiology Study Assignment

For this assignment you will chose a problem and design an epidemiologic study to test a hypothesis about it. The problem might be defined in relation to an outcome (e.g., a disease or a biological risk factor for a disease), in which case you would design a study to test a hypothesis about it's possible cause(s); or the problem might be defined in relation to an exposure (e.g. an environmental chemical, smog, food or beverage intake or other behaviors), in which case you would design a study to test a hypothesis about it's possible causal connection to one or more health outcomes. You can use any of the study designs discussed in the course but you will need to justify your choice and identify the strengths and weaknesses of

that choice for studying the problem. Guidance and an example for this assignment are available on the Blackboard site (in "Course Documents"). The assignment will be worth 10 points. Five (5) points will be deducted for an assignment turned in late. No assignments will be accepted beyond 24 hours of the deadline.

Final examination

This course has a university-scheduled final examination. **In Fall 2011 it is December 12, from 2-5pm.** Please do not make plans to leave campus until after this examination as no make-up examination will be made to accommodate end-of-semester travel.

Attendance and Quizzes

Attendance at all class sessions is mandatory. As a manner of encouraging attendance, 5 unannounced quizzes will be given throughout the semester. **You get to drop the lowest grade on the quizzes (including one that you may have missed) s**o each quiz will count for 2.5% of your final grade (10% overall). If you must miss a class, it is your responsibility to obtain missed material from a fellow student.

Participation and Policies on Laptops and Cell Phones

Every class requires hours of careful preparation from your professor, and your full attention and regular participation is expected at each meeting. This includes careful note taking, asking thoughtful questions, and responding regularly to questions posed by the instructor. It is my job as your professor to provide a respectful, supportive and focused learning environment in order to achieve our learning objectives for the course. You will not need mobile phones or laptop computers to be successful in this course and these devices provide much temptation for distraction and reduce our abilities to be present in conversations. Therefore, these devices will not be allowed during class time. If special circumstances require laptops during the course, I will notify you in advance. Please plan for class accordingly, ready to take notes by hand. Please contact me if you have a special need that requires you to take notes using a laptop.

Honor Code

All students are expected to be familiar with and to adhere the College's Honor System. Those who violate the Honor Code will be given a grade of zero for the assignment and/or a failing grade for the course. The system can be found in your Student Handbook, and at http://www.wm.edu/offices/deanofstudents/services/studentconduct/studenthandbook/honor_system/index.php

Availability of the Instructor

I am available during my regularly scheduled office hours, MWF from 9-10am, and by appointments made via email (sbickes@wm.edu) or phone (757-221-1902). MW offices hours will be held in Adair 114; Friday hours will be held at the Daily Grind. I have an open door policy for brief questions. I generally will not be able to answer questions about exams or assignments in the final 24 hours before an exam or deadline. Please plan in advance, or ask a student for help. I prefer to answer questions in person or over the phone as managing email for such a large class may become difficult. Please make good use of office hours. *These can be used to*

discuss topics outside of the course (i.e. graduate school, research interests, career goals, etc.) Try to make it by at least once so that I can get to know you better!

Hints for Success and Satisfaction

Courses at W&M differ in subject matter, organization, workload expectations, teaching styles, instructor personalities and many other ways. Students at W&M differ in disciplinary backgrounds, learning styles, reasons for taking various courses, work ethic, demands on their time and many other ways. This situation almost guarantees that some students will be very successful and satisfied with any given course and others will be less successful and less satisfied. Here are a few hints to consider regarding KINE 385 that may increase your success and satisfaction.

Purpose: The primary purpose of KINE 385 is to provide you with a set of 'portable conceptual tools" from the field of epidemiology, which can be applied to a wide range of health and social issues and help you become a more critical-thinking and 'epi-literate' citizen and professional. We use a variety of case studies during the semester, but the primary focus is on these conceptual tools, not the cases per se. The case studies are only a (hopefully interesting) way to master the tools. That is why the exams do not focus on the details of the cases, but only on how they illustrate the application of the tools.

A related point is that the course emphasizes comprehension of the tools, while having much lighter treatment of empirical analysis, quantitative calculations, etc. Again, the calculations that are included here are simply intended to enhance your comprehension of basic concepts, rather than aiming to prepare you to do those calculations or understand all the nuances. The latter might be an objective of an intermediate epidemiology course.

Context and Ambiguity: Some courses, often in the natural sciences, life sciences and biomedical sciences emphasize the 'hard facts, truths and universal laws' that underlie those disciplines. Other courses, typically in the social sciences, humanities and law, are heavily based on concepts and theories whose validity can vary from one context to another. Epidemiology, as taught in this course, is a mix of these two. Some aspects of disease causation, transmission and treatment, etc do have some hard empirical realities associated with them. And one purpose of epidemiology is to uncover these. However, these processes often are quite complex and quite dependent on context; our resources and methods for studying them often are quite limited; and our implementation of even a rigorous study design such as a randomized controlled trial typically is imperfect. Thus, even though the definition of core concepts and principles of epidemiology may be quite clear in the abstract, there often is a lot of ambiguity concerned how these should be applied in the real world and how the results of a study might best be interpreted. We will see many examples in this course. The important 'hint' from this is that you should not expect this course to 'feel' like a physics, chemistry or physiology course. It is more likely to feel like a series of detective stories in which some of the facts in the case are firm but much of the evidence is partial, murky and inconsistent. You should expect the epidemiology concepts and principles to be clear in the abstract but you should expect their application and interpretation to be ambiguous in a given context. Seeing

this in action, and getting comfortable that this is the nature of the world in epidemiology studies, is a very important "meta-goal" of the course.

Reading: As noted above, it is important to read the assigned chapters and papers before each lecture. Lectures are not meant to be a simple regurgitation of the text. Therefore, lectures will not cover everything from the text, and vice versa. Some of the end-of-chapter questions of particular importance are assigned to you in the syllabus; however, most of the questions will help reinforce your learning so it is good practices to work through all of the questions at the end of each assigned chapter.

Core concepts: Every effort will be made to identify the core concepts associated with lectures and the analysis of the empirical case studies. A cumulative list of all the core concepts also is available on Blackboard.

Date	Day	Class	Topic	Assignment Due
24-Aug	Wed	1	Course Overview & Introduction to Epidemiologic Thinking	Rothman Ch. 1
26-Aug	Fri	2	Dynamics of Disease Transmission	Gordis Ch. 1-2, *Answer q. 1,2, 7, 8 in Ch. 1*
29-Aug	Mon	3	Measuring the Occurrence of Disease I: Morbidity	Gordis Ch. 3, *Answer q. 1,2,5,6,7 in Ch. 3*
31-Aug	Wed	4	Measuring the Occurrence of Disease II: Mortality	Gordis Ch. 4
2-Sep	Fri	5	**Problem Session**	None
5-Sep	Mon	6	Assessing the Validity and Reliability of Diagnostic Screening Tests	Gordis Ch. 5, pp. 85-96
7-Sep	Wed	7	Predictive Value of a Test; Reliability and Validity	Gordis Ch. 5, pp. 96-106
9-Sep	Fri	8	**Problem Session**	None
12-Sep	Mon	9	Natural History of Disease: Ways of Expressing Prognosis	Gordis Ch. 6
14-Sep	Wed	10	Assessing Efficacy of Preventive and Therapeutic Measures: RCTs	Gordis Ch. 7 - 8, *Answer q. 1-6, 8 in Ch. 8*
16-Sep	Fri	11	**Problem Session**	None
19-Sep	Mon	12	Causation I: Using Epidemiology to Identify the Cause of Disease	Gordis pp.165-166; Rothman Ch. 2
21-Sep	Wed	13	Causation II: Deriving Inferences from Epidemiologic Studies; Keys to Understanding Articles on Epidemiologic Studies	Gordis Ch. 14 (*Answer questions 1-6 in Ch. 14*); Hebel, JR & RJ McCarter (2006) Epidemiology and Biostatistics. Ch. 17.
23-Sep	Fri	14	**Problem Session**	None
26-Sep	Mon	15	Cohort Studies	Gordis Ch. 9
28-Sep	Wed	16	**MIDTERM 1**	None
30-Sep	Fri	17	**Problem Session**	None
3-Oct	Mon	18	Case Control Studies and Other Study Designs	Gordis Ch. 10, 13
5-Oct	Wed	19	Estimating Risk & Estimating the Potential for Prevention	Gordis Ch. 11, 12
7-Oct	Fri	20	**Problem Session**	
10-Oct	Mon		**No Class: Fall Break**	None
12-Oct	Wed	21	More on Causal Inference: Bias, Confounding	Gordis Ch. 15, pp. 247-255
14-Oct	Fri	22	**Problem Session**	None
17-Oct	Mon	23	More on Causal Inference: Interaction	Gordis Ch. 15, pp. 256-263 (*Answer q. 1,2,7,8 in Ch. 17*)
19-Oct	Wed	24	Identifying the Cause of Disease Occurrence & Cohort Studies	Gordis Ch. 16

21-Oct	Fri	25	Comparative effectiveness studies (Dr. Biehl, PhD)	Sturmer et al. (2011) *Int J of Epid*. 22(3):298-301
24-Oct	Mon	26	The state of the science: CONSORT and STROBE	Rothwell & Bhatia (2007). British Medical Journal. 20: 806-808; Altman et al. (2001) *Annals of Int Med*. 137 (8): 663-694.
26-Oct	Wed	27	Case: Ecological Study: Income inequality and health in the U.S.	Kaplan et al., *British Medical Journal.* 312:999-1003, 1996; **Media Assignment Due at 2pm**
28-Oct	Fri	28	**Problem Session**	None
31-Oct	Mon	29	Case: RCT: Seafood and Omega 3s Dietary Supplementation with n-3 PUFAs. The GISSI Study	The GISSI Study Team. *Lancet* 354 (9177): 447-455, 1999.
2-Nov	Wed	30	Case: RCT: Maternal DHA and the Development of Attention in Infancy and Toddlerhood	Colombo et al., *Child Development.* 75(4):1254-1267, 2004 **Email topic of your Epi Study Assign. by 5pm**
4-Nov	Fri	31	Case: Meta Analyses of Childhood growth in low-and-middle-income countries	**Victora** et al. *Pediatrics.* **2010** 125(3):473-80.
7-Nov	Mon	32	**MIDTERM 2**	Gordis Ch. 13 for review of study designs
9-Nov	Wed	33	Case: RCT of male circumcision for reduction of HIV infection risk: the ANRS 1265 Trial.	Auvert et al. *PLoS Medicine* 2(11):1112-1122 2005.
11-Nov	Fri	34	Case: The peculiar history of estrogen replacement therapy: endometrial cancer, heart disease, osteoporosis and breast cancer (Prof. Buchanan, MD)	Gordis Ch. 19; Additional articles TBA
14-Nov	Mon	35	Case: The grand cohort studies of the 20th century: the Framingham Study, the British Doctors Study (Prof. Buchanan, MD, MPH)	TBA
16-Nov	Wed	36	Case: Dengue Fever: Modeling the Dynamics of Multi-strain Disease Transmission (Prof. Shaw, PhD)	TBA **Epi Study Assignment Due at 2pm**
18-Nov	Fri	37	**Problem Session**	None
21-Nov	Mon	38	Majors Epidemiologic Transitions, Past and Present	TBA
23-Nov	Wed		**No Class: Thanksgiving Holiday**	None
25-Nov	Fri		**No Class: Thanksgiving Holiday**	None
28-Nov	Mon	39	Applying Epidemiology to Evaluation and Public Policy	Gordis Ch. 19
30-Nov	Wed	40	Selected Presentation of Student Epidemiology Studies	None
2-Dec	Fri	41	Course Summary & Review	None
12-Dec	Mon		**FINAL EXAM 2-5 pm**	