

**Mel and Enid Zuckerman College of Public Health
University of Arizona**

**Biostatistics for Research
Epidemiology/Public Health 576B
Spring Semester 2008**

Time: Monday and Wednesday 10:30 am – 11:50 am

Location: A116 Drachman Hall

Instructor: Denise J. Roe, Dr.P.H.
Professor, Epidemiology & Biostatistics
A240 Drachman Hall
Telephone: 626-3975
droe@email.arizona.edu

Office Hours: Monday Noon – 1:00 pm
Thursday 1:00 pm - 2:00 pm or by appointment

TA: Betsy Chaitkin Wertheim
betsy@email.arizona.edu

TA Office Hours: Tuesday 2:00 pm – 4:00 pm
A319 Drachman Hall

Course Description

An intermediate course in biostatistical methods and their application in epidemiology and public health. This course covers linear regression analysis, logistic regression analysis, time-to-event (survival) analysis, and study design.

Course Prerequisites

Statistics: Public Health 576A (Introduction to Biostatistics)
Epidemiology: Epidemiology 573A (Basic Principles in Epidemiology)
Computing: Ability to use a statistical computing package (Stata, SAS, SPSS)

Course Objectives

1. Apply statistical principles of sample size and power estimation to aid in the design of studies.
2. Use statistical modeling techniques, such as linear regression, logistic regression, time-to-event analysis, and Poisson regression, as appropriate, to meet research objectives in epidemiologic and public health studies.
3. Analyze data by deciding the appropriate statistical techniques and insuring that the assumptions are met.
4. Critically evaluate the use of statistics in published journal articles.

Course Notes

A webpage has been created for this class using the Desire 2 Learn (D2L) interface. The course website contains the syllabus, class notes, homework assignments, STATA do-files, datasets (used in lecture and for the homework) and readings.

The website also will be a forum for frequently asked questions on lecture topics and homework assignments. Class announcements also will be posted on this site, so it is a good idea to check the site before each class to stay current.

To access the 576B website, login at: <http://d2l.arizona.edu/index.asp>

- Click the 'UA NetID' Login.
- Enter your NetID and password, as you would to access your UA email account.

Under 'My Academic Courses', click on: 'EPID CPH 576B SP08 Biostatistics for Research'

- News: This section contains any class announcements, such as changes in the homework schedule, etc.
- Content: Access the syllabus, class notes, homework assignments and datasets in this section.
- FAQ: Contains frequently asked questions on homework or lecture topics.

For further information on how to use the D2L interface, go to:

<http://help.d2l.arizona.edu/students.htm> and select 'Getting Started'

Recommended Texts (Will be on reserve in the AHSC Library)

- V** **Regression Methods in Biostatistics: Linear, Logistic, Survival, and Repeated Measures Models**, Eric Vittinghoff, David V. Glidden, Stephen C. Shiboski, Charles E. McCulloch, Springer, New York, 2005
(* below implies that the material is more advanced than required for the course)
- A** **Computer-Aided Multivariate Analysis Fourth Edition**, Abdelmonem Afifi, Virginia A. Clark and Susanne May, Chapman & Hall, Boca Raton, FL, London, 2004
- R** **Fundamentals of Biostatistics Fifth Edition**, Bernard Rosner, Duxbury Press, Belmont, CA, 2000
- H** **Applied Logistic Regression Second Edition**, David W. Hosmer and Stanley Lemeshow, John Wiley & Sons, Inc., New York, 2000
- K** **Survival Analysis: A Self-Learning Text Second Edition**, David G. Kleinbaum and Mitchel Klein, Springer-Verlag, New York, 2005

STATA Survival Guide Version 9 (Available through the D2L website)

Student Evaluations

1. Assignments
 - a. Homework: There will be 10 graded homework assignments. Each will be discussed in class on the day shown on the syllabus (typically Monday). To be graded, they must be turned in no later than Wednesday by 5:00 pm during the week discussed.
 - b. Examinations:

Exam	Date and time	Lectures and homework
Midterm 1	Monday, February 25 10:30 – 11:50 am	LI – 1 through LI – 6 CA – 1 through CA – 3 Homework 1 – 4
Midterm 2	Wednesday, April 9 10:30 – 11:50 am	CA – 4 through CA – 5 LO – 1 through LO – 5 Homework 5 - 8
Final	Friday, May 9 11 am – 1 pm	Cumulative with emphasis on SU – 1 through SU – 6 Homework 9 - 11

All exams will be closed book. For each midterm, students are encouraged to bring one 8½ x 11 page of notes and formulas; for the final, students are allowed to bring up to three 8½ x 11 pages of notes and formulas.

2. Grades
 10% Homework
 25% Midterm 1
 25% Midterm 2
 40% Final

Example of computation of final score:

	Score	Weight	Points
Homework	90	0.10	9.0
Midterm 1	80	0.25	20.0
Midterm 2	92	0.25	23.0
Final	91	0.40	<u>36.4</u>
Total			88.4

The final grades are based on the following point system (the instructor reserves the right to revise this scale, if necessary)

- A 90-100%
- B 80- 89%
- C 70- 79%
- D 60- 69%
- E < 60%

Policy on Class Attendance

Class attendance is **strongly encouraged**. If a student misses class, they are responsible for meeting all course deadlines, and for working with other students and the instructor (during office hours) to catch up. All holidays or special events observed by organized religions will be honored for those students who show affiliation with that particular religion. Absences pre-approved by the UA Dean of Students (or Dean's designee will be honored.)

Course Outline

Notes	Date	Topic	Assignment	Reading
Linear Regression Analysis				
Overview LI – 2	Wed, 1/16	Overview Multiple linear regression	Homework 1	V 4.1 – 4.3.3 A Ch 7
LI – 3	Wed, 1/23	Regression diagnostics		V 4.7
LI – 4	Mon, 1/28	Review Homework 1 Analysis of covariance	Homework 2	V (4.4 – 4.6)* A 9.3
LI – 5	Wed, 1/30	Missing data		A 9.2
LI – 6	Mon, 2/4	Review Homework 2 Predictor Selection	Homework 3	V 5.1 – 5.6 A Ch 8
Categorical Data Analysis				
CA – 1 CA – 2	Wed, 2/6	Comparing two proportions Power and sample size estimation		V 3.4.1 – 3.4.2 R 10.1 – 10.5
CA – 3	Mon, 2/11	Review Homework 3 Power and sample size estimation in epidemiology studies	Homework 4	
CA – 3	Wed, 2/13	Power and sample size estimation in epidemiology studies		
	Mon, 2/18	Review Homework 4		
	Wed, 2/20	Review	Practice Midterm	
	Mon, 2/25	Midterm 1		
CA – 4	Wed, 2/27	Stratified analysis		V 3.4.4 R 13.5.1 – 13.5.2
	Mon, 3/3	Review Midterm 1	Homework 5	
CA – 5	Wed, 3/5	Stratified analysis: Tests for trend		V 3.4.3 R 13.5.4
Logistic Regression				
LO – 1	Mon, 3/10	Review Homework 5 Logistic regression	Homework 6	V 6.1 – 6.2.1, (6.6)* H Ch 1 – Ch 2
LO – 2	Wed, 3/12	Logistic regression: Interaction and confounding		V 6.2.2 – 6.2.3 H 3.6 – 3.7

Notes	Date	Topic	Assignment	Reading
Spring Recess				
LO – 3	Mon, 3/24	Review Homework 6 Logistic regression: Model selection	Homework 7	H Ch 4
LO – 4	Wed, 3/26	Logistic regression: Goodness-of-fit		V 6.2.4 – 6.2.5 H Ch 5.1 – 5.2
LO – 4	Mon, 3/31	Review Homework 7 Logistic regression: Goodness-of-fit	Homework 8	
LO – 5	Wed, 4/2	Logistic regression: Diagnostics		V 6.4 H 5.3
	Mon, 4/7	Review Homework 8 Review	Practice Midterm	
	Wed, 4/9	Midterm 2		
Survival Analysis				
SU – 1	Mon, 4/14	Survival analysis	Homework 9	V 3.5.1 – 3.5.5 K Ch 1, 2.1 – 2.3
	Wed, 4/16	Review Midterm 2		
SU – 2	Mon, 4/21	Review Homework 9 Comparison of survival curves	Homework 10	V 3.5.6 K 2.4 – 2.6
SU – 3	Wed, 4/23	Cox proportional hazards model		V 7.1 – 7.2 K Ch 3
SU – 4	Mon, 4/28	Review Homework 10 Cox proportional hazards model: Diagnostics	Homework 11	V 7.4 K Ch 4
SU – 5	Wed, 4/30	Poisson regression model		
SU – 6	Mon, 5/5	Review Homework 11 Logistic versus Cox versus Poisson regression analysis		
	Wed, 5/7	Review	Practice Final	
	Fri, 5/9	Final 11 am – 1 pm		

Academic Integrity

Students are expected to abide by the University of Arizona Code of Academic Integrity found at <http://w3.arizona.edu/~studpubs/policies/cacaint.htm>. Specifically, students can work together on the homework but are expected to turn in an independently generated assignment. All midterm and final answers are to be the independent work of the student.

Classroom Behavior

Students are expected to be respectful of the instructor and other students at all times (including limited talking, no reading newspapers, etc.). Cell phones may be brought to class but should be in the mute or vibrate position. If you must take an emergency call or page during class please leave class quietly to speak with the caller (do not leave and return more than once as this disrupts the rest of the class).

Students are expected to be familiar with the UA Policy on Disruptive Behavior in an Instructional Setting found at http://hr2.hr.arizona.edu/dos/pol_disrupt.htm and the Policy on Threatening Behavior by Students found at http://hr2.hr.arizona.edu/dos/pol_threat.htm

Grievance Policy

http://grad.arizona.edu/Current_Students/Policies/Grievance_Policy.php

Disability Accommodation

Students who are registered with the Disability Resource Center must submit appropriate documentation to the instructor if they are requesting reasonable accommodations:
<http://drc.arizona.edu/instructor/syllabus-statement.shtml>

Syllabus Changes

Information contained in the course syllabus, other than the grade and absence policies, may be subject to change with reasonable advance notice, as deemed appropriate.