

Course Outline

Principles of Statistical Inference

Biostatistics 600 Section 4

Instructor: J. Michael "Mike" Bowling, Ph.D.

Teaching Assistant: Kari Samuel

Catalog Description

This course will review the use of basic descriptive statistics and equip students with a conceptual understanding of the calculation and interpretation of inferential statistics in public health research. This course will also introduce students to the use of computers in the analysis of data using SAS, a statistical programming package.

Disclaimer

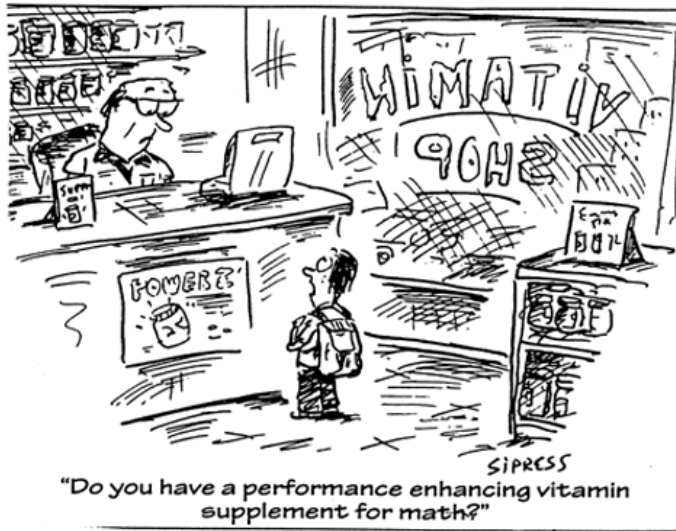
This course will not:

- **make you a statistician. A first step maybe, but every chapter of our book has a separate course on campus devoted entirely to that subject. Students should take at least one additional statistics course if they plan to undertake a quantitative MPH Major Paper. This course is a prerequisite for that.**
- **make you a SAS programmer. You will be introduced to the use of a computer for statistical analysis. I am not aware of any quantitative researcher who calculates statistics entirely by hand, and therefore, you need to be aware of the fundamentals of computer assisted analysis at a very rudimentary level.**

Extended Description

This course is intended for students with some familiarity in the use and interpretation of descriptive statistics in scientific research. While not insurmountable, students who do not have some statistical background may find the initial pace of the course somewhat disconcerting. On the other hand (a commonly used statistical phrase), most first year students find the pace of

graduate school disconcerting and therefore will not consider this out of the ordinary. I will teach this course from the presumption that each of you can add, subtract, multiply, and divide sufficiently well to balance your checkbook, calculate an appropriate TIP at a local restaurant, and make change. Based upon my previous experience with this course, it seems as though "math anxiety" is a greater impediment to learning biostatistics that math competency. However, this



course is difficult and students should take every opportunity to obtain assistance when they are having difficulties.

Global Health Emphasis



In Biostatistics 600, students will be exposed to a variety of global public health topics. In effort to enrich students' understanding of global public health issues, global content will be incorporated in a variety of ways, including Global Health homework assignments and readings, lecture examples and test examples.

For the purposes of this course, global content will be defined as "health problems that transcend national boundaries, that may be influenced by circumstances or experiences in other countries, and that are best addressed by cooperative actions, and solutions," whether they occur in developing countries, countries in advanced transition, or industrialized countries. / Source: Institute of Medicine, America's Vital Interest in Global Health, Washington DC, National Academies Press, 1997./ Within many units, questions from "Global Health Activities" will be used to highlight important statistical concepts using examples and journal articles centered on global health topics. Watch for this symbol to indicate that global content is being incorporated.

Assessment

Assessment of instruction and student progress will be based upon four quizzes. Each quiz will have two components: 1) questions to be answered at home representing 90% of the quiz grade and 2) a 15 minute in-class portion consisting of one question. Quizzes during the semester will be distributed on Thursdays and returned the following Tuesdays. The in-class component will be administered on the Tuesday due date of the take home. The fourth take home will be due on the exam day with the final in-class question answered then. Each quiz will be cumulative in that a thorough understanding of the subject matter necessitates the mastery and retention of earlier material. Homework assignments, some involving the computer, will be assigned on a periodic basis. They will not be graded. They are based upon activities that you will be asked to perform on the quizzes. The following scale will be used to assign a letter grade at the completion of the course:

92-100 = H

80-91 = P

70-79 = L

0-69 = F

SAS Statistical Software

We will be using SAS, a statistical software package to analyze data for this course. SAS is available at all computer labs on campus so and it is not essential that you load a copy of the program on your personal computers. It is probably more convenient if you have a copy for your personal use and is free of charge to UNC students. You can find details of how to purchase a software DVD from <https://help.unc.edu/4207>. Oh and it only works on a Mac if you have it partitioned to operate with Windows as well as Mac OS.

Required Text & Equipment

Principles of Biostatistics, Marcello Pagano and Kimberlee Gauvreau, 2nd Ed. Duxbury Press, 2000.

Note that purchase of the textbook is optional. No homework questions will be assigned from the text. Students should be familiar with all material covered in

the assigned pages of the text, but material considered to be most important will be covered in class.

Some Additional Reference Texts

1. "Statistics" by David Freedman, Robert Pisani & Roger Purves.
2. "Fundamentals of Biostatistics" by Bernard Rosner.
3. "Biostatistics, a methodology for the health sciences" by Lloyd D. Fisher & Gerald van Belle.
4. "Statistical Methods" by Rudolf J. Freund and William J. Wilson.
5. "Intuitive Biostatistics" by Harvey Motulsky.
6. "The Visual Display of Quantitative Information" by Edward R. Tufte.
7. "Nonparametric Statistics for Health Care Research" by Marjorie A. Pett.
8. "Statistics, a self teaching guide" by Donald Koosis.

Helpful Computer Programming Texts (one only)

SAS System for Elementary Statistical Analysis, Schlotzhauer, S. and R. Littell, SAS Institute Inc., 1987.

The Little SAS Book: A Primer, Second Edition, Delwiche, L. D. and S. J. Slaughter, SAS Institute Inc., 1998.

Important Class Stuff

Lectures: Tuesday and Thursday, 9:30-10:45

Office Location: Room 309 Rosenau

Office Hours: Tuesday 11:00-12:00

Email: jbowling@email.unc.edu or ksamuel@email.unc.edu

Telephone


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Home: 928-8955 I don't mind calls before 9:00 PM or weekends.

Class Schedule

Class Date	Topic	Readings	Assignments
Tu 25-Aug	Class Overview		
Th 27-Aug	Presenting and Summarizing Data	P&G: Ch. 2 & 3.1-3.2	HW 1
	COMPUTER TRAINING: Thursday, Aug 27, 3:30-5:30 Computer Lab Rosenau 201A	SAS Handout	
	COMPUTER TRAINING: Friday, Aug 28, 2:00-4:00 Computer Lab Rosenau 201A	SAS Handout	
	COMPUTER TRAINING: Monday, Aug. 31, 10:30-12:30 Computer Lab Rosenau 201A	SAS Handout	

Tu01-Sept	Presenting and Summarizing Data		
Th03-Sept	Probability	P&G: Ch. 6.1-6.2	HW 2
Tu08-Sept	Theoretical Probability Distributions: Binomial & Poisson	P&G: Ch. 7.1-7.3	HW 3
Th10-Sept	Theoretical Probability Distributions: Binomial & Poisson		
Tu15-Sept	Theoretical Probability Distributions: Normal	P&G: Ch. 7.4	HW 4
Th17-Sept	Theoretical Probability Distributions: Normal		
Tu22-Sept	TURN IN FIRST EXAM		
Tu22-Sept	Sampling Distribution of the Mean	P&G: Ch. 8	HW 5
Th24-Sept	Estimation: Confidence Intervals around Means	P&G: Ch. 9	HW 6
Tu29-Sept	Hypothesis Testing: One Sample Tests of Means	P&G: Ch. 10	HW 7
Th 01-Oct	Hypothesis Testing: One Sample Tests of Means		
Tu 06-Oct	Hypothesis Testing:	P&G: Ch. 11	HW 8

	Comparison of Two Means		
Th 08-Oct	Hypothesis Testing: Comparison of Two Means		
Tu 13-Oct	TURN IN SECOND EXAM		
Tu 13-Oct	Nonparametric Methods of Comparing Two Samples	P&G: Ch. 13	
Th 15-Oct	Analysis of Variance	P&G: Ch 12	HW 9
Tu 20-Oct	Analysis of Variance		
Th 22-Oct	<i>Fall Break—No class and have fun!</i>		
Tu 27-Oct	Correlation: Pearson's & Spearman's	P&G: Ch. 17	HW 10
Th 29-Oct	Simple Linear Regression	P&G: Ch. 18	HW 11
Tu 03-Nov	Simple Linear Regression		
Th 05-Nov	Simple Linear Regression		
Tu 10-Nov	TURN IN THIRD EXAM		

Tu 10-Nov	Estimation and Hypothesis Testing for Proportions	P&G: Ch. 14	HW 12
Th 12-Nov	Estimation and Hypothesis Testing for Proportions		
Tu 17-Nov	Contingency Tables: The Chi-Square Test	P&G: Ch. 15.1	HW 13
Th 19-Nov	Contingency Tables: The Chi-Square Test		
Tu 24-Nov	The Odds Ratio and McNemar's Test	P&G: Ch. 15.2-15.3	HW 14
Th 26-Nov	Thanksgiving		
Tu 01-Dec	Logistic Regression	P&G: Ch. 20.1	HW 15
Th 03-Dec	A Really Big Party or Review for Exam		
Th 17-Dec	TURN IN FOURTH EXAM	Final scheduled for 8am	