Health Policy Research 604
Introduction to Statistics for Health Policy
Autumn, 2017

Instructor:	Andrew Spieker, Ph.D.	1313 Blockley
	Email: aspieker@upenn.edu	
TA:	Ali Valcarcel	
	Email: alval@upenn.edu	
Class Sessions:	Tu/Th, 10:30 AM - 11:50 AM	1319 Blockley
Course Website:	https://canvas.upenn.edu/courses/1373611	

Course Description: This is the first semester of a two-semester sequence in introductory applied statistics. This semester focuses on descriptive statistics and data presentation, probability, random variables and their distributions, sampling distributions, estimation, confidence intervals, and hypothesis testing. Students will learn how to recognize different sources and structures of data, and formally construct and test relevant hypotheses. There will be a strong emphasis on the proper interpretation of results.

Textbook: We will use the following text: Pagano, M. and Gauvreau, K. *Principles of Biostatistics*, 2nd Ed. Belmont CA: Brooks/Cole, 2000. The chapters corresponding to each set of lecture notes will be posted on our Canvas webpage.

Required Notes: The course notes (lecture slides) will be made available on the course website. The slides will generally be posted in advance, and then extended slides posted at the end of each set of lecture notes.

Recordings: Lectures will be recorded. Despite best efforts, technological difficulties may prevent recordings from being posted on occasion. The textbook, the availability of lecture notes, and the audio recordings are not an adequate substitute for attending class.

Andrew's Office Hours: I will hold office hours from 8:00 AM to 9:00 AM on Tuesdays in 1313 Blockley. I will also be available by appointment. Please email me to set up an appointment in advance.

Ali's Office Hours/Stata Labs: Stata labs will be Wednesdays from 1:30 PM - 2:50 PM (schedule below), with office hours from 3:00 PM - 3:30 PM. Office hours will be 1:30 PM - 2:30 PM in weeks without Stata labs. Ali's labs and office hours will be in 1319 Blockley.

08/30	Introduction to Stata
09/06	Data structures/summaries in Stata
09/27*	Distributions and random variables in Stata
10/11	Data manipulation in Stata
10/25	Confidence intervals and hypothesis testing in Stata
11/15	The Chi-Squared test in Stata
11/29	Paired/matched data and nonparametric tests in Stata

* - Rescheduled for 3:00 PM - 4:30 PM

Learning Objectives: By the end of the course, students should ordinarily be able to:

- Use statistical software (Stata) to enter data, compute numeric summary measures, graphically represent data, and perform basic statistical inference procedures.
- Develop point/interval estimates and test relevant hypotheses for differences in means and proportions.
- Weigh scientific evidence using statistical principles, and interpret a study's validity and generalizability on the basis of its sampling scheme.
- Describe how the purpose of data analysis affects the strategy used to compute relevant summary measures and conduct inference.

Assignments and Grades: You will be assessed in a number of ways throughout the semester, so that no single assignment can make or break a final grade.

Homework Assignments: 50%
Homework assignments showing good-faith effort will receive a minimum of half credit; only assignments with impeccable solutions will receive full marks.

Exams (Three): 45%
Exams will be closed book/notes, each worth 15%. You will need a scientific calculator.

Course Participation: 5%
I will periodically have quick index-card questions (graded for completeness, not correctness). You must turn in 10/15 assigned cards to receive participation credit.

You can expect assignments to be graded in a timely fashion. Your total numeric grade will be sensibly converted to a letter grade.

Course Policies: Below is a list of some key course policies.

    <u>On Electronic Devices</u>: Please turn off the volume on any electronic devices (you may use your computer to follow the course notes). No electronic devices beyond a scientific calculator are permitted for exams.

    <u>On Collaboration</u>: You are permitted to work together on homework assignments, but your write-up should be your own. Exams are an individual, not a collaborative effort.

    <u>On Grading</u>: Grading concerns should be directed to me, and not to Ali. If you believe there was an grading error, see me. I reserve the right to change or not change the grade.

    <u>On Academic Honesty</u>: Students are encouraged to familiarize themselves with the university's academic honesty policies. Issues surrounding academic integrity will be handled in accordance with university policies.

    <u>On Extra Help</u>: You are not expected to understand all of the concepts the very first time you see them. If you cannot attend office hours, I strongly encourage you to make arrangements with me or Ali to get extra help. If using email to ask questions regarding course content, you should copy *both* me and Ali.

    <u>On Late Work</u>: Late work will not be accepted, except in the most extraordinary of circumstances, approved by me. If you have an exam conflict, you must see me in advance so that we may work something out.

    <u>On Access and Accommodations</u>: Your experience in this class is important to me. Please communicate any approved accommodations to me at your earliest convenience so we can discuss your needs in this course.

Tentative Topic Outline: This is a proposed outline of course topics. reserve the right to change this as the course progresses. It will be my responsibility to alert the class of changes.

    Unit 1: Data structures, descriptive statistics ($\approx$ one-two weeks)
    Unit 2: Probability and random variables ($\approx$ three-four weeks)
    Unit 3: Sampling distributions and confidence intervals ($\approx$ three weeks)
    Unit 4: Hypothesis testing ($\approx$ three weeks)
    Unit 5: Epidemiologic measures of excess risk ($\approx$ one week)
    Unit 6: Miscellaneous (confounding, paired data, nonparametric methods, and correlation) ($\approx$ three weeks)

	Work Due	Exams	Topic	Notes
Tu - 8/29			Welcome!	
Th - 8/31			Types of data	
Tu - 9/5			Descriptive statistics	
Th - 9/7			Fundamentals of probability	
Tu - 9/12	HW1		Fundamentals of probability	
Th - 9/14			Diagnostic accuracy	
Tu - 9/19			Random variables and distributions	
Th - 9/21	HW2		Discrete distributions (binomial and related)	
Tu - 9/26			Discrete distributions (Poisson)	
Th - 9/28	HW3		The normal distribution	
Tu - 10/3			The central limit theorem	
W - 10/4	HW4			
Th - 10/5				NO CLASS
Tu - 10/10		Exam 1		Covers 8/29 - 9/28
Th - 10/12			Sampling distribution of the mean	
Tu - 10/17			Confidence intervals	
Th - 10/19	HW5		Confidence intervals	
Tu - 10/24			Hypothesis testing and p-values	
Th - 10/26	HW6		Hypothesis testing and p-values	
Tu - 10/31			Comparison of two means	
Th - 11/2	HW7		Comparison of two proportions	
Tu - 11/7			Measures of excess risk	
Th - 11/9		Exam 2		Covers 10/3 - 10/26
Tu - 11/14			Inference on risk ratios and odds ratios	
Th - 11/16	HW8		Paired/matched data	
Tu - 11/21			Nonparametric methods	Thursday Schedule
Th - 11/23				NO CLASS
Tu - 11/28			Basics of survival analysis	
Th - 11/30	HW9		Sample size calculations	
Tu - 12/5	HW10		Correlation	
Th - 12/7		Exam 3		Covers 10/31 - 12/5