

## COURSE INFORMATION

### STATISTICAL METHODS IN PUBLIC HEALTH III (140.623) THIRD TERM

January 25 – March 17, 2011

**Instructors:** Marie Diener-West, Ph.D. (Section 01)  
Office E-3622, 502-6894

Karen Bandeen-Roche, Ph.D. (Section 02)  
Office E-3527, 955-3067

Department of Biostatistics  
Johns Hopkins University  
Bloomberg School of Public Health

**Lectures:** 10:30 a.m. - 12:00 p.m. – Tuesday, Thursday  
Sommer Hall (E2014)- Section 01  
Sheldon Lecture Hall (W1214)- Section 02  
Overflow Room - W3030

**Labs for review, questions, and help with the problem sets:**

Lab 1	-	1:30 p.m. - 3:00 p.m.	-	Monday	W3008
Lab 2	-	1:30 p.m. - 3:00 p.m.	-	Tuesday	W3008
Lab 3	-	1:30 p.m. - 3:00 p.m.	-	Wednesday	W3008
Lab 4	-	1:30 p.m. - 3:00 p.m.	-	Thursday	W3008
Lab 5	-	1:30 p.m. - 3:00 p.m.	-	Friday	W3008
Lab 6	-	3:30 p.m. - 5:00 p.m.	-	Monday	W3008
Lab 7	-	3:30 p.m. - 5:00 p.m.	-	Tuesday	W3008
Lab 8	-	3:30 p.m. - 5:00 p.m.	-	Wednesday	W3008
Lab 9	-	3:30 p.m. - 5:00 p.m.	-	Thursday	W3008

Open time in lab for questions: 3:00 p.m – 3:30 p.m. Monday through Friday

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**Lab Instructors:**

**Karen Bandeen-Roche, Ph.D.  
Marie Diener-West, Ph.D.  
John McGready, Ph.D.  
Jeffrey Goldsmith (Lead TA)  
Hilary Parker (Lead TA)**

**Teaching Assistants:**

**Jiawei Bai  
Li Chen  
Yiyun (Star) Chen  
Jeongyong Kim  
Julio Lamprea Montealegre  
Finbarr Leacy  
Kirsten Lum  
John Muschelli  
Yang Ning  
Daniel Obeng  
Thomas Prior  
Ah young Shin  
Soong (Rinda) Thing  
Yingying Wei  
Xiaowei Zhou**

**Teaching Assistant Office Hours (starting Tuesday, January 25, optional):**

**Monday through Friday    12:15 p.m. - 1:15 p.m.    W2009**

**Computer lab for Stata help (starting Tuesday, January 25, optional):**

**Monday through Friday    2:30 p.m. - 3:20 p.m.    W3025**

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**Lecture Notes:** Copies of the course materials are distributed during class. Purchase of these materials is included in registration. Copies of most materials are available for downloading in the “Classes” section of the course web site.

**Web Site:**

Available through CoursePlus or <http://www.biostat.jhsph.edu/courses/bio623/>  
Contains course schedule, office hours, lecture notes, self-evaluation problems, Stata lecture notes and problem set and quiz solution keys.

**Audio files:** An audio lecture is available after each lecture on the course website.

**Recommended Book:** Lawrence C. Hamilton  
Statistics with Stata 10  
2008, Duxbury, Thomson Brooks/Cole, Belmont, California

**Recommended Book:** Rosner, B.  
Fundamentals of Biostatistics  
2010, Duxbury, Thomson Brooks/Cole, Belmont, California

**Calculator:** Basic functions (+, -, ×, ÷), logarithms and exponents, simple memory and recall, factorial key.

**Statistical Computing Package:** Stata 11 Intercooled, Stata Press, College Station, Texas  
(Buy through [www.stata.com/gpdirect](http://www.stata.com/gpdirect))

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#### Course Grade Based on:

- 20% completion of 4 problem sets (points deducted if turned in late)
- 5% quiz 1 (in class)
- 5% quiz 2 (in class)
- 35% midterm examination (in class)
- 35% final examination (in class)

#### Course Objectives:

Students who successfully master this course will be able to:

1. Use statistical reasoning to formulate public health questions in quantitative terms:
  - (a) Critique a proposed public health hypothesis to determine its suitability for testing using regression methods and the available data.
  - (b) Formulate and correctly interpret a multivariable linear, logistic or survival regression model to estimate a health effect while minimizing confounding and identifying possible effect modification.
  - (c) Evaluate the limitations of observational data as evidence for a health effect
  - (d) Appreciate the importance of relying upon many regression models to capture the relationships among a response and predictor in observational studies.

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2. Conduct statistical computations and construct graphical and tabular displays for regression analysis :
  - (a) Use the statistical analysis package Stata to perform multivariable regression models.
  - (b) Document and archive the steps of your statistical analysis by creating a Stata do-file.
  - (c) Create and interpret scatter-plots and adjusted variable plots that display the relationships among an outcome and multiple risk factors.
  - (d) Create and interpret tables of regression results including unadjusted and adjusted estimates of coefficients with confidence intervals from many models.
  
3. Use probability models to describe trends and random variation in public health data:
  - (a) Distinguish between the underlying probability distributions for modeling continuous, categorical, binary and time-to-event data.
  - (b) Recognize the key assumptions underlying a multivariable regression model and judge whether departures in a particular application warrant consultation with a statistical expert.

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4. Use statistical methods for inference in multiple regression to draw valid public health inferences from data:
  - (a) Conduct a simple linear, logistic or survival regression and correctly interpret the regression coefficients and their confidence interval.
  - (b) Conduct a multiple linear, logistic or survival regression and correctly interpret the coefficients and their confidence intervals.
  - (c) Examine residuals and adjusted variable plots for inconsistencies between the regression model and patterns in the data and for outliers and high leverage observations.
  - (d) Fit and compare different models to explore the association between outcome and predictor variables in an observational study.

The course is designed to enable students to develop their data analysis skills. Four important datasets will be analyzed by the students using the statistical package Stata throughout the 621-624 course sequence.