

Course Title: Building and Evaluating Regression Models
Course Number: Biostatistics 210
Fall 2016

A. Objectives

This is a fourth course in statistics, covering advanced methods for building and evaluating regression models. The emphasis is on methods which cuts across common families of regression models in biostatistics: missing data, causal inference, predictor selection, model diagnostics and model comparison. The statistics package STATA will be used throughout the course. Stata 14.

Prerequisites

Designing Clinical Research (Epi 180.04), Biostatistics 208, Biostatistics 209, and possession of a M.D., Ph.D., D.D.S. or Pharm.D. or equivalent doctoral degree. Exceptions to these prerequisites may be made with the consent of Dr. Glidden, space permitting.

B. Faculty

Instructor: Dave Glidden, Ph.D.
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Teaching Assistant: Barbara Grimes, PhD
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C. Format

1. **Lectures:** Tuesdays 10:30 to 12:00, MH 1406
No class 10/8 or 11/22

2. **Sections:** Tuesdays 3:15 to 4:15 MH 1407
On 9/27, 10/11, 10/25, 11/8 and 11/29

D. Textbook

Regression Methods in Biostatistics by Vittinghoff. ISBN: 978-1-4419-1905-2, 2nd Ed.

E. Grading

Grades will be based on 5 homework assignments (100%).

F. Syllabus

Date	Title Content	Reading
9/13/16	Introduction: Review of regression; major model questions, properties of a good regression model	
9/20/16	Functional Form: Splines, smoothing, categorizing continuous predictors	Greenland, 1995
9/27/16	Repeated Measures Data: Mixed models, generalized estimating eqns.	Vittinghoff, Ch 7
10/4/16	Missing Values: Types of missing data, MCAR/MAR/NAR, maximum likelihood	Vittinghoff, Ch 11.1-11.4, 11.6
10/11/16	Multiple Imputation: Choice of imputation model, mi package	Vittinghoff, Ch 11.5, 11.7-11.8
10/25/16	Missing Data: Multiple imputation, maximum likelihood, inverse weighting	Vittinghoff, Ch 11.9
11/1/16	Causal Inference: Strengthening causal inference using regression	Vittinghoff, Ch 9.1-9.2
11/8/16	Propensity Scores: Propensity scores for casual inference and contrast with regression models	Vittinghoff, Ch 9.4
11/15/16	Predictive Models: Building Models for Prediction	Vittinghoff, Ch 10.1
11/29/16	Model Validation: Assessing for Prediction	Steyerberg, 2010
12/6/16	Model Comparison: Quantifying Improvement in Prediction	Pencina, 2008