

Course Title: Building and Evaluating Regression Models
Course Number: Biostatistics 210
Fall 2017

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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C. Format

1. **Lectures:** Tuesdays 10:30 to 12:00, MH 1406
No class 10/24 or 11/21
2. **Sections:** Tuesdays 3:15 to 4:15 MH 1407
On 9/26, 10/10, 11/7 and 11/28

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
9/12/17	Introduction: Review of regression; major model questions, properties of a good regression model	
9/19/17	Functional Form: Splines, smoothing, categorizing continuous predictors	Greenland, 1995
9/26/17	Repeated Measures Data: Mixed models, generalized estimating eqns.	Vittinghoff, Ch 7
10/3/17	Missing Values: Types of missing data, MCAR/MAR/NAR, maximum likelihood	Vittinghoff, Ch 11.1-11.4, 11.6
10/10/17	Multiple Imputation: Choice of imputation model, mi package	Vittinghoff, Ch 11.5, 11.7-11.8
10/17/17	Missing Data: Multiple imputation, maximum likelihood, inverse weighting	Vittinghoff, Ch 11.9
10/31/17	Causal Inference: Strengthening causal inference using regression	Vittinghoff, Ch 9.1-9.2
11/7/17	Propensity Scores: Propensity scores for casual inference and contrast with regression models	Vittinghoff, Ch 9.4
11/14/17	Predictive Models: Building Models for Prediction	Vittinghoff, Ch 9.4
11/28/17	Model Validation: Assessing for Prediction	Steyerberg, 2010
12/5/17	Model Comparison: Quantifying Improvement in Prediction	Pencina, 2008