Biostatistics 536/Epidemiology 536
Categorical Data in Epidemiology
Autumn 2016

Instructor: Kathleen Kerr, katiek@uw.edu
Health Sciences Building F-667

Teaching Assistants:
Allison Meisner
Chaoyu Ian Yu

Office Hours:
Allison Meisner: Mondays 12:45-2:15 (Health Sciences Library)
Katie Kerr: Tuesdays 3:30-4:30 (HSB F-667), or by appointment
Ian Yu: Thursdays (starting Oct 6) 9-10:30 (Health Sciences Library)

Grading Scheme:
Final exam: 35%
Midterm exam: 30%
Data Analysis Project: 15%
Homework: 20%

Course Topics:
Measures of Disease Occurrence and Association
Confounding and Collapsibility
Directed Acyclic Graphs
Marginal and Conditional Confounding Control
Simplest Logistic Models for Cohort studies
Simplest Logistic Models for Case/Control studies
General Logistic Regression Model; Estimators and Test Statistics
Adjusting for Confounders using Regression
Exposure Variable Models
Effect Modification on the Multiplicative Scale
Regression Diagnostics
Conditional Logistic Regression; Application to Matched Data
Logistic regression for Risk Prediction
Polytomous Logistic Regression

Possible special topics: propensity score adjustment, sample size/ power calculations; effect modification on the additive scale; mediation analysis

Prerequisites:
Upon entering this course, you are expected to have completed courses in introductory statistics or biostatistics, and multiple regression including logistic regression. You should
understand fundamental statistical concepts including sampling distributions, parameter estimation and confidence intervals, and statistical hypothesis tests. You should know how to fit multiple linear regression models, how to interpret regression coefficients in multiple linear regression models, and how to perform hypothesis tests about regression coefficients. You should be familiar with case-control, cross-sectional and cohort study designs.

**Learning Objectives:**
After successfully completing this course, you can expect to be able to:
1. Identify summary measures most pertinent to a particular scientific question, including whether the summary measure should be adjusted or unadjusted.
2. Distinguish between adjusted and unadjusted odds ratios and other summary measures; Describe the difference in interpretation between an adjusted an unadjusted summary measures.
3. Fit appropriate logistic regression models to data from epidemiologic studies using STATA or other statistical software.
4. Interpret regression coefficients from logistic regression models fit to data from epidemiological studies, including cross-sectional, cohort, and case-control data.
5. Characterize the limitations on parameter interpretations when analyzing unmatched and matched case-control data.
6. Use and interpret elements of statistical inference properly, including confidence intervals and p-values.
7. Explain when logistic regression methods should be replaced by conditional logistic regression methods.
8. Present results of analyses using logistic regression in a manner suitable for publication in a scientific journal.
9. Use logistic regression to estimate risks of a binary outcome. Interpret measures of risk model discrimination such as AUC. Use graphical methods to evaluate the calibration of a risk model.

**Homework:**
There will be approximately 8 homework assignments during the course. Students will always have at least 6 days to complete a homework assignment. Late homework is not accepted, even for good reasons. Because of this strict policy, the lowest homework score for each student will be dropped when calculating course grades. Note: there will be at least a 1-hour “grace period” after the due date/time before students can no longer upload homework. An assignment submitted during this grace period is eligible for full credit even if the system marks it late.

Homework is viewed as part of the learning experience of this course and not as a tool for evaluating mastery of course material. Therefore, homework will be graded based on a **good faith effort** to answer all homework questions. Submitted assignments demonstrating a good faith effort to all questions will receive the maximum of 10 points.
As a learning experience, students may work together on homework. Submitted work should reflect a student’s own understanding of the problem. In summary, it is OK to work together but it is never OK to copy another student’s work.

In order to receive credit, homework should be neat, well-organized, and written in clear, grammatically-correct English using complete sentences. Raw output from software is unacceptable. Plots should be labeled, including axis labels, and options such as scale should be chosen to make the plot as informative as possible. Homework submissions that do not meet these standards will not be credited.

Homework will be graded 10, 9, or 0 based on whether the student demonstrates a good faith effort to answer all of the questions on the assignment. Part of demonstrating a good faith effort is following the guidelines for homework above.

10: A good-faith effort was made on all parts of all problems.
9: A good-faith effort was made on all but very minor parts of one or a few problems. (For example, omitting a small component in part of a question). Or homework was complete but was below-standard in some places.
0: At least one problem, or many parts of some problems did not receive a good-faith effort. (For example, not attempting to answer part of a question, or not attempting a whole question, or pasting software output rather than answering a question.)

**When you upload your completed homework, make sure you upload the correct file.**

**Questions on course material and Email policy**

Students who have questions on course material have the following resources: raise the question in class, raise the question in discussion section, attend office hours, ask the question on the Canvas discussion board. The Canvas discussion board is particularly useful for software questions (STATA and R).

Email is not an appropriate venue for asking questions about course material. Such emails to the instructor or TAs will not receive a response.

**Acknowledgment**

A great deal of course material has been adapted from previous instructors, most notably Barbara McKnight.

**Access and Accommodation**

http://depts.washington.edu/uwdrs/faculty-resources/syllabus-statement/

The experience of every student in this class is important. It is the policy and practice of the University of Washington to create inclusive and accessible learning environments consistent with federal and state law. If you experience barriers based on disability, please seek a meeting
with Disability Resources for Students (DRS) to discuss and address them. If you have already established accommodations with DRS, please communicate your approved accommodations to Dr. Kerr at your earliest convenience.

Disability Resources for Students (DRS) offers resources and coordinates reasonable accommodations for students with disabilities. Reasonable accommodations are established through an interactive process between you, your instructors and DRS. If you have not yet established services through DRS, but have a temporary or permanent disability that requires accommodations (this can include but not limited to; mental health, attention-related, learning, vision, hearing, physical or health impacts), you are welcome to contact DRS at 206-543-8924 or uwdrs@uw.edu or disability.uw.edu.

**Academic Integrity**
http://sph.washington.edu/students/academicintegrity/

Students at the University of Washington (UW) are expected to maintain the highest standards of academic conduct, professional honesty, and personal integrity. The UW School of Public Health (SPH) is committed to upholding standards of academic integrity consistent with the academic and professional communities of which it is a part. Plagiarism, cheating, and other misconduct are serious violations of the University of Washington **Student Conduct Code** (WAC 478-120). We expect you to know and follow the university’s policies on cheating and plagiarism, and the **SPH Academic Integrity Policy**. Any suspected cases of academic misconduct will be handled according to University of Washington regulations. For more information, see the University of Washington **Community Standards and Student Conduct** website.

Here are links for the text above in boldface:
UW Student Conduct Code (WAC 478-120)
SPH Academic Integrity Policy
http://sph.washington.edu/students/academicintegrity/
Community Standards and Student Conduct
http://www.washington.edu/cssc/