BMI/PHS 551: Introduction to Biostatistics for Population Health
Fall 2018

Webpage: Canvas `https://canvas.wisc.edu/courses/119731`

Classroom and meeting times:

WARF 758; Tue, Thu 2:30-3:30p; Wed 2:30-3:50p

Text reference:

Basic & Clinical Biostatistics
(4^{th} edition)
by Dawson and Trapp
Online copy available for free at the library website:
`https://search.library.wisc.edu/catalog/9911121949302121`

Software:

Software use will be limited, but it is helpful to try out SAS or other software on the data provided with the book and lectures. In addition, you are expected to look up items such as statistical calculators on the internet during class and for homework.

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Office hours: Tue 1-2p, WARF 685

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Credit hours: 3

UW-Madison credit hour policy:

This course meets the Traditional Carnegie Definition for how credit hours are met by the course. Students in the course have 3.33 hours/week of direct faculty/instructor instruction during lectures and labs, and are expected to spend a minimum of two hours per credit hour on work related to this course outside of class time.

Official course description:

Course designed for population health researcher. Topics include descriptive statistics, elementary probability, probability distributions, one- and two-sample normal inference (point estimation, hypothesis testing, confidence intervals), power and sample size calculations, one- and two-sample binomial inference, underlying assumptions and diagnostic work.

Requisites:

Declared in the Population Health or Epidemiology graduate program; not open to students who have taken BMI/STAT 511 or BMI/STAT 541

Grading:

Your course work will be weighted out of 100 points, broken down as follows:

Written homework:	15 pts
Participation:	5 pts
Quizzes:	15 pts
Midterm 1:	20 pts
Midterm 2:	20 pts
Final exam:	25 pts

Written Homework:

Homework assignments are due **at the beginning of class** roughly every other Thursday (Thu 9/20, Thu 9/27, Thu 10/18, Thu 11/1, Tue 11/20, and Thu 12/6). There are six assignments in total. You are encouraged to work together on homework assignments, but **you must write up your solutions independently**. Homework assignments should be well organized and reasonably neat. It is required that you show your work in order to receive credit. Homeworks will be structured so that they can be done using hand calculation, spreadsheets or software- your choice. If using software, only essential computer output should be turned in, and it must be accompanied by a written explanation of what the output shows.

Participation:

Attendance and participation in each class and laboratory session is required. Students will be work in small groups to work through exercises. If you are unable to attend a class or lab session, please notify the instructor in advance to make alternative arrangements. Although in-class work is not directly graded, they play an extremely important role in learning.

Quizzes:

There will be up to 23 short quizzes (roughly every class day, except when homework is due or on review or exam days). The two lowest quiz scores will be dropped. Quizzes will be short, online or in-class assignments to primarily test comprehension of reading assignments. A quiz could involve definitions, computations or explanations.

Exams:

You will have two midterm exams and one final exam. No calculators, note cards, books, or other outside materials are allowed on any exam.

First Midterm:	Wed, October 3, in class
Second Midterm:	Wed, November 7, in class
Final Exam:	Tue, December 18, 10:05a-12:05p

Make-up exams will be available only to students who have a serious emergency, a strongly compelling personal reason, or grave academic conflict.

Accommodations for students with disabilities:

McBurney Disability Resource Center syllabus statement: "The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodations for students with disabilities is a shared faculty and student responsibility. Students are expected to inform faculty [me] of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. Faculty [I], will work either directly with the student [you] or in coordination with the McBurney Center to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations as part of a students educational record, is confidential and protected under FERPA." `http://mcburney.wisc.edu/facstaffother/faculty/syllabus.php`

Table of specific learning goals and outcomes classified by level:

Level	Goals	Outcomes
Knowledge	Know and recognize terminology, symbols, definitions and formulas	Recognize and name graphs, descriptive statistics and measures of association Recall definitions and rules of different types of probability Recall terminology for populations and samples and estimators, and parameters Reproduce commonly used probability distribution formulas and parameters Name concepts and terminology for hypothesis tests and confidence intervals Formally state null and alternative hypotheses Recall formulas to construct hypothesis tests and confidence intervals for different types of parameters and one, two and multiple samples Define confounding and stratification Recall formulas for stratified analysis (Mantel Haenszel, direct standardization) Recall formulas and terminology for basic regression analysis
Comprehension	Explain the meaning, assumptions, and interrelationships of concepts and formulas	Explain the assumptions of the binomial, Poisson and normal distribution Explain the difference between the sampling distribution and data distribution Explain the implications of the Central Limit Theorem for sampling distributions Explain the properties of a good estimator Explain the logic of statistical hypothesis testing and confidence intervals Explain the assumptions of specific hypothesis tests and confidence intervals Explain the difference between the paired and independent samples t-tests Explain the relationship between confidence intervals and hypothesis tests Explain the function of stratified estimators and tests Explain the relationship between regression analysis and estimation of means
Application	Execute probability and statistical calculations from information provided	Produce graphical displays and descriptive statistics Compute measures of association Use binomial, Poisson and normal distributions to calculate probabilities of events Use probability rules to compute specified probabilities of events Perform one, two and multiple sample hypothesis tests (one and two sample tests for means and proportions, multiple sample for proportions) Compute confidence intervals for means, proportions and their differences, and for variances Perform power and sample size calculations for one- and two- sample hypothesis tests on means and proportions
Analyses	State assumptions, conclusions and interpretation in terms of statistical and probability computations	State assumptions of and interpret hypothesis tests and confidence intervals for means, proportions and variances from, one, two and multiple samples in subject matter terms Interpret the results of one-, two- and multiple sample hypothesis tests in subject matter terms. Interpret measures of association in subject matter terms
Evaluation	Assess and critique statistical methods used in published articles	Evaluate whether assumptions required for statistical analyses appear met Evaluate whether reported statistical results appear correct, based on tables provided Assess whether alternative methods would have been appropriate Evaluate the strength of the results in subject matter terms