DEPARTMENT OF PUBLIC HEALTH SCIENCES COURSES

Autumn 2020

Epidemiology and Population Health
PBHS 30910
Course Instructor: Diane Lauderdale
T/Th 4:20-5:40pm
PQ: STAT 22000 or other introductory statistics highly desirable.
ID: STAT 22810, PPHA 36410, ENST 27400; HLTH 20910
Epidemiology is the basic science of public health. It is the study of how diseases are distributed across populations and how one designs population-based studies to learn about disease causes, with the object of identifying preventive strategies. Epidemiology is a quantitative field and draws on biostatistical methods. Historically, epidemiology's roots were in the investigation of infectious disease outbreaks and epidemics. Since the mid-twentieth century, the scope of epidemiologic investigations has expanded to a fuller range non-infectious diseases and health problems. This course will introduce classic studies, study designs and analytic methods, with a focus on global health problems.

Applied Regression Analysis
PBHS 32400
Course Instructor: Jim Dignam
T/Th 11:20am-12:40pm
PQ: PBHS 32100; STAT 22000 or equivalent
ID: STAT 22400 (Primary)
This course is an introduction to the methods and applications of fitting and interpreting multiple regression models. The main emphasis is on the method of least squares. Topics include the examination of residuals, the transformation of data, strategies and criteria for the selection of a regression equation, the use of dummy variables, tests of fit. Stata computer package will be used extensively, but previous familiarity with Stata is not assumed. The techniques discussed will be illustrated by real examples involving biological and social science data.

Statistical Applications
PBHS 33500
Course Instructor: Robert Gibbons
M/W 1:50-3:10pm
PQ: PBHS 32400/STAT 22400 or equivalent, and PBHS 32600/STAT 22600, or PBHS 32700/STAT 22700 or equivalent; or consent of instructor.
ID: STAT 35800; CHDV 32702
This course provides a transition between statistical theory and practice. The course will cover statistical applications in medicine, mental health, environmental science, analytical chemistry, and public policy. Lectures are oriented around specific examples from a variety of content areas. Opportunities for the class to work on interesting applied problems presented by U of C faculty will be provided. Although an overview of relevant statistical theory will be presented, emphasis is on the development of statistical solutions to interesting applied problems.
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Winter 2021

Epidemiologic Methods
PBHS 31001
Course Instructor: Dezheng Huo
T/Th 1-2:20pm
PQ: PBHS 30700 or PBHS 30910 and PBHS 32400 or applied statistics courses through multivariate regression or consent of instructor
ID: STAT 35700
This course expands on the material presented in "Principles of Epidemiology," further exploring issues in the conduct of epidemiologic studies. The student will learn the application of both stratified and multivariate methods to the analysis of epidemiologic data. The final project will be to write the "specific aims" and "methods" sections of a research proposal on a topic of the student's choice.

Cancer Epidemiology
PBHS 31200
Course Instructor: Brian Chiu
M/W 1:50-3:10pm
PQ: PBHS 30700 or PBHS 30900
The purpose of this course is to review the basic concepts and issues relevant to cancer epidemiology. Specifically, this course will focus on interpreting cancer statistics, and describing the current state of knowledge regarding the etiology and risk factors for the major cancer sites. In addition, issues in research design and interpretation within the context of cancer epidemiology, as well as the molecular and cellular basis of carcinogenesis as it pertains to cancer occurrence in populations will be discussed. The course is appropriate for students who have an introductory knowledge of epidemiology. Previous study of cancer biology is helpful but not required.

Analysis of Categorical Data
PBHS 32600
Course Instructor: Lin Chen
M/W/F 10:20-11:10am
PQ: PBHS 32100; STAT 22000; or consent of instructor.
ID: STAT 22600 (Primary)
This course covers statistical methods for the analysis of qualitative and counted data. Topics include description and inference for binomial and multinomial data using proportions and odds ratios; multi-way contingency tables; generalized linear models for discrete data; logistic regression for binary responses; multi-category logit models for nominal and ordinal responses; loglinear models for counted data; and inference for matched-pairs and correlated data. Applications and interpretations of statistical models are emphasized.

Biostatistical Methods
PBHS 32700
Course Instructor: Lin Chen
T/Th 11:20am-12:40pm
PQ: PBHS 32400/STAT 22400; or STAT 24500; or equivalent; or consent of instructor
ID: STAT 22700
This course is designed to provide students with tools for analyzing categorical, count and time-to-event data frequently encountered in medicine, public health and related biological and social sciences. The course will emphasize application of the methodology rather than statistical theory, including recognition of the appropriate methods, interpretation and presentation of results. Methods covered include: contingency table analysis, Kaplan-Meier survival analysis, Cox proportional-hazards survival analysis, logistic regression, Poisson regression.

Introduction to Clinical Trials
PBHS 32901
Course Instructor: Mei Polley
T/TH 2:40-4:00pm
PQ: PBHS 32100; STAT 22000; introductory statistics; or consent of instructor
ID: STAT 35201
This course will review major components of clinical trial conduct, including the formulation of clinical hypotheses and study endpoints, trial design, development of the research protocol, trial progress monitoring, analysis, and the summary and reporting of results. Other aspects of clinical trials to be discussed include ethical and regulatory issues in human subjects research, data quality control, meta-analytic overviews and consensus in treatment strategy resulting from clinical trials, and the broader impact of clinical trials on public health.

Advanced Topics in Health Economics
PBHS 38400
Course Instructor: Tamara Konetzka
Offered: M/W 1:50-3:10pm
PQ: Graduate courses in microeconomics and econometrics or statistics, including the use of linear and nonlinear regression methods.

The purpose of this course is to provide substantial exposure to the state of the evidence and the major theoretical and empirical approaches used to study salient issues in health economics. Selected topics may vary from year to year; examples include health capital, health insurance, health behaviors, health care market structure and competition, not-for-profit ownership, payment incentives, and the effects of information on provider behavior (e.g. public reporting and value-based purchasing) and consumer behavior (e.g., advertising and medical decision making). The course is aimed at students who wish to pursue a career in, or related to, health economics. Students will be expected to read each paper in depth, participate in discussions about them, and present and discuss several papers during the quarter. The instructors will assume that students have had prior graduate courses in microeconomics and econometrics or statistics, including the use of linear and nonlinear regression methods.

Applied Bayesian Modeling and Inference
PBHS 43010
Course Instructor: Yuan Ji
Offered: T/Th 1-2:20pm
PQ: STAT 24400 and STAT 24500 or master level training in statistics.

Course begins with basic probability and distribution theory, and covers a wide range of topics related to Bayesian modeling, computation, and inference. Significant amount of effort will be directed to teaching students on how to build and apply hierarchical models and perform posterior inference. The first half of the course will be focused on basic theory, modeling, and computation using Markov chain Monte Carlo methods, and the second half of the course will be about advanced models and applications. Computation and application will be emphasized so that students will be able to solve real-world problems with Bayesian techniques.

Introduction to Causal Inference
PBHS 43201
Course Instructor: Guanglei Hong
Offered: W 9:10am-12pm
PQ: Intermediate statistics or equivalent such as STAT 22400/PBHS 32400, PPHA 31301, BUS 41100 or SOCI 30005.
ID: CHDV 30102 (Primary)

This course is designed for graduate students and advanced undergraduate students from social sciences, education, public policy, public health sciences, social service administration, and statistics who are involved in quantitative research and are interested in studying causality. The course begins by introducing the notion of counterfactual outcomes and various causal inference techniques that are comparatively new to most social scientists. A major emphasis will be placed on conceptualizing causal questions, comparing alternative research designs, and identifying the assumptions under which a causal effect can be estimated from non-experimental data. In addition to studying experimental, quasi-experimental, and non-experimental designs, students will become familiar with causal inference techniques suitable for evaluating binary treatments, concurrent multi-valued treatments, time-varying treatments, as well as moderated and mediated treatment effects in non-experimental data.

Policy Analysis Methods and Applications
PBHS 45610
Course Instructor: Harold Pollack
Offered: Th 9:30am-12:20pm
PQ:
ID: SSAD 45600 (Primary); PPHA 40101

This course examines the intellectual bases and analytic tools for the professional practice of policy analysis, with an emphasis on economic policy analysis in the form of cost-benefit analysis, decision analysis, and cost-effectiveness.
analysis. Many examples will be drawn from medicine and public health, which offer particularly clear application of the basic methods. However we will also draw upon examples and challenges from environmental policy, criminal justice, transportation, and welfare policy.

Topics to be covered will include cost-benefit analysis, decision analysis, quality of life and cost measurement, model development and parameter estimation, and cost-effectiveness methods. Students will have weekly problem sets and instruction in a computer lab that will provide them with hands on experience performing decision analysis and cost-effectiveness analyses. Students taking this course will be prepared to take Advanced Applications of Cost-Effectiveness Analysis, which provides doctoral-level training in this area.
Social Inequalities in Health: Race/Ethnicity & Class
PBHS 31450
Course Instructor: Aresha Martinez-Cardoso
T/Th 2-3:20pm
PQ: Introductory statistics course.
ID: HLTH 27450
This course examines how social stratification and social inequality shape racial/ethnic and socioeconomic inequalities in health. In particular, we will explore the production of race and class inequality in the US and draw on the extant theoretical and empirical literature to understand how these social factors influence health behaviors and health outcomes. Finally, we will review both the classic and emerging methodological approaches used by public health and social scientists to measure and test how these features of society get "under the skin" to shape a variety of health outcomes.

Global Health Metrics
PBHS 31900
Course Instructor: Kavi Bhalla
T/Th 3:30-4:50pm
PQ: None
ID: PBHS 27900; PBPL 27905; HLTH 27905
This course provides an overview of the causes of illness and injury in populations across the world and the most important risk factors. We will discuss how population health is measured using summary indicators that combine mortality and non-fatal health outcomes. We will use these indicators to compare and contrast the health of populations across global regions and in time. Sound measurement of the global burden of disease is essential for prioritizing prevention strategies. Therefore, there will be a strong emphasis on understanding how data sources in information-poor settings are used to generate estimates of population health.

Applied Longitudinal Data Analysis
PBHS 33300
Course Instructor: Don Hedeker
T/TH 11-12:20
PQ: PBHS 32400/STAT 22400 or equivalent, and PBHS 32600/STAT 22600, or PBHS 32700/STAT 22700 or equivalent; or consent of instructor.
ID: STAT 36900; CHDV 32501
Longitudinal data consist of multiple measures over time on a sample of individuals. This type of data occurs extensively in both observational and experimental biomedical and public health sciences, as well as in studies in sociology and applied economics. This course will provide an introduction to the principles and methods for the analysis of longitudinal data. Whereas some supporting statistical theory will be given, emphasis will be on data analysis and interpretation of models for longitudinal data. Problems will be motivated by applications in epidemiology, clinical medicine, health services research, and disease natural history studies.

Health Services Research Methods
PBHS 35100
Course Instructor: Prachi Sanghavi
M/W 1:30-2:50pm
PQ: At least one course in linear regression and basic familiarity with STATA; or consent of instructor.
ID: PPHA 38010; SSAD 46300; HLTH 29100
The purpose of this course is to better acquaint students with the methodological issues of research design and data analysis widely used in empirical health services research. To deal with these methods, the course will use a combination of readings, lectures, problem sets (using STATA), and discussion of applications. The course assumes that students have had a prior course in statistics, including the use of linear regression methods.
The purpose of this course is to introduce students to the concepts needed to critically evaluate U.S. health policy issues. The course will 1) provide an overview of the U.S. health system including its institutions, stakeholders, and financing mechanisms, 2) describe the politics of health and illuminate how the structure of our political system shapes health policy outcomes, and 3) offer a framework for assessing the critical features central to health policy debates. Building upon this knowledge, the course will conclude with a discussion of strategies for influencing the health policy process and how they might be employed in future leadership roles within the health sector.