DEPARTMENT OF PUBLIC HEALTH SCIENCES COURSES OFFERED BY QUARTER

Autumn 2022

**Epidemiology and Population Health**  
PBHS 30910  
COURSE INSTRUCTOR: Diane Lauderdale  
DAY & TIME: T/Th 3:30-4:50pm  
PQ: STAT 22000 or other introductory statistics highly desirable.  
CROSS-LIST ID: STAT 22810; ENST 27400; HLTH 20910; PPHA 36410

*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.*

**Social Inequalities in Health: Race/Ethnicity & Class**  
PBHS 31450  
COURSE INSTRUCTOR: Aresha Martinez-Cardoso  
DAY & TIME: M 1:30-4:20pm  
PQ: PBHS 32100 or STAT 22000 or introductory statistics course.  
CROSS-LIST ID: CRES 27450, 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.*

**Introduction to Biostatistics**  
PBHS 32100  
COURSE INSTRUCTOR: John Cursio  
DAY & TIME: T//Th 11a-12:20p  
PQ: 2 quarters of pre-calculus  
CROSS-LIST ID:

*This course will provide an introduction to the basic concepts of statistics as applied to the bio-medical and public health sciences. Emphasis is on the use and interpretation of statistical tools for data analysis. Topics include (i) descriptive statistics; (ii) probability and sampling; (iii) the methods of statistical inference; and (iv) an introduction to linear and logistic regression.*

*In addition to the course, there is a statistical computing workshop held on Wednesdays from 10-11:30am.*

**Applied Regression Analysis**  
PBHS 32400  
COURSE INSTRUCTOR:  
DAY & TIME: T/Th  
PQ: PBHS 32100 or STAT 22000 or equivalent  
Students can take either PBHS 32400/STAT 22400 or PBHS 32410/STAT 22401  
CROSS-LIST ID: STAT 22400 (Primary)

*This course introduces the methods and applications of fitting and interpreting multiple regression models. The primary emphasis is on the method of least squares and its many varieties. 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, nonlinear models, biases due to excluded variables and measurement error, and the use and interpretation of computer package regression programs. The techniques discussed are illustrated by many real examples involving data from both the natural and social sciences. Matrix notation is introduced as needed.*

**Introduction to Clinical Trials**  
PBHS 32901  
COURSE INSTRUCTOR: Mei Polley  
DAY & TIME: T/TH 2-3:20pm
This course will review major components of clinical trial conduct, including ethical and regulatory issues in human subject research, the formulation of clinical hypotheses and study endpoints, research protocol structure, various design elements, phase I-III trial designs, sample size methods, fundamentals of survival analysis, trial progress monitoring, and the analysis and reporting of clinical trial results. Additional topics may include roles of biomarkers in clinical trials and the broader impact of clinical trials on public health.

Statistical Applications
PBHS 33500
COURSE INSTRUCTOR: Robert Gibbons
DAY & TIME: M/W 1:30-2:50pm
PQ: PBHS 32400 or PBHS 32410 or equivalent, and PBHS 32600/STAT 22600, or PBHS 32700/STAT 22700 or equivalent; or consent of instructor. Knowledge of STATA and/or R highly recommended
CROSS-LIST 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.

Foundations of Public Health
PBHS 34100
COURSE INSTRUCTOR: David Moskowitz
DAY & TIME: T/Th 5-6:20pm
PQ: MPH students only; or consent of instructor
This course provides an overview and introduction to the role, theories, and methods of health promotion and health behavioral science in addressing the public health needs of the 21st Century. The course will cover a wide range of topics including: the history of public health, the basic institutional and organizational structures created to monitor public health; socio-cultural factors in disease etiology and the role of social conditions and social policy in addressing critical public health problems; individual, group, and community strategies for health behavior change; and current issues (e.g., eHealth) in behavioral science for health promotion. The course provides students with the opportunity to critically analyze current literature and gain an understanding of health promotion, its evolution, underlying theories, applications, and effectiveness in promoting health and preventing illness.

Introduction to U.S. Health Policy and Politics
PBHS 35500
COURSE INSTRUCTOR: Loren Saulsberry
DAY & TIME: W 12:30-3:20pm
PQ: N/A
CROSS-LIST ID: HLTH 25500; PBPL 25500; SSAD 45011; PPHA 37720;
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.

MPH Capstone
PBHS 39300
COURSE INSTRUCTOR: David Moskowitz
DAY & TIME: T 9:30-12:20pm
PQ: MPH students only; or consent of instructor
DEPARTMENT OF PUBLIC HEALTH SCIENCES COURSES

Winter 2023

**Epidemiologic Methods**
PBHS 31001  
COURSE INSTRUCTOR: Dezheng Huo  
DAY & TIME: T/Th 12:30-1:50pm  
PQ: PBHS 30910 and PBHS 32400/STAT 22400 or PBHS 32410 (taken concurrently) or applied statistics courses through multivariate regression.  
CROSS-LIST ID: STAT 35700  
This course provides students with an in-depth understanding of epidemiologic concepts and methods. It is the second course in the epidemiology series. The focus of this course will be in practical and theoretical considerations of observational research methods; statistical methods and applications in epidemiologic studies; in-depth evaluation of bias, confounding, and interaction; and communicating epidemiologic findings. Students will also learn how to perform data analysis using classic methods.

**Cancer Epidemiology**
PBHS 31200  
COURSE INSTRUCTOR: Brian Chiu  
DAY & TIME: M/W 1:30-2:50pm  
PQ: PBHS 30910  
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.

**Regression Analysis for Health and Social Research**
PBHS 32410  
COURSE INSTRUCTOR: Jim Dignam  
DAY & TIME: T/Th 11a-12:20p  
PQ: PBHS 32100 or STAT 22000 or equivalent  
Students can take either PBHS 32400/STAT 22400 or PBHS 32410/STAT 22401, but not both.  
CROSS-LIST ID: STAT 22401  
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 health and social science data.

**Applied Longitudinal Data Analysis**
PBHS 33300  
COURSE INSTRUCTOR: Don Hedeker  
DAY & TIME: T/TH 9:30-10:50am  
PQ: PBHS 32400 or PBHS 32410 or equivalent, and PBHS 32600/STAT 22600, or PBHS 32700/STAT 22700 or equivalent; or consent of instructor.  
CROSS-LIST 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.

**Foundations of Public Health**
PBHS 34100  
COURSE INSTRUCTOR: David Moskowitz  
DAY & TIME: TBD  
PQ: MPH students only; or consent of instructor
This course provides an overview and introduction to the role, theories, and methods of health promotion and health behavioral science in addressing the public health needs of the 21st Century. The course will cover a wide range of topics including: the history of public health, the basic institutional and organizational structures created to monitor public health; socio-cultural factors in disease etiology and the role of social conditions and social policy in addressing critical public health problems; individual, group, and community strategies for health behavior change; and current issues (e.g., eHealth) in behavioral science for health promotion. The course provides students with the opportunity to critically analyze current literature and gain an understanding of health promotion, its evolution, underlying theories, applications, and effectiveness in promoting health and preventing illness.

Foundations of Public Health
PBHS 34100
COURSE INSTRUCTOR: David Moskowitz
DAY & TIME: TBD
PQ: MPH students only; or consent of instructor
This course provides an overview and introduction to the role, theories, and methods of health promotion and health behavioral science in addressing the public health needs of the 21st Century. The course will cover a wide range of topics including: the history of public health, the basic institutional and organizational structures created to monitor public health; socio-cultural factors in disease etiology and the role of social conditions and social policy in addressing critical public health problems; individual, group, and community strategies for health behavior change; and current issues (e.g., eHealth) in behavioral science for health promotion. The course provides students with the opportunity to critically analyze current literature and gain an understanding of health promotion, its evolution, underlying theories, applications, and effectiveness in promoting health and preventing illness.

Health Behavior Theory & Health Communication
PBHS 34200
COURSE INSTRUCTOR: Marcia Tan and David Moskowitz
Day/Time: T/Th 2-3:20pm
PQ: MPH Student Only; or Consent of Instructor
This course addresses the psychological, social, and environmental determinants of a wide range of health and health-related behavior. Theoretical models from the behavioral and social sciences will be used to explain health behavior at the individual, interpersonal, and community levels. The course emphasizes the acquisition of theoretical understandings, but also is intended to improve actions or activities undertaken for the purpose of promoting, preserving, or restoring wellness. Towards that end, students in this course will learn how to use peer-reviewed research and key social marketing principles to develop a comprehensive and effective social marketing campaign; learn how to target health communication efforts towards specific audiences and via varied channels of distribution; understand the role of social media and technology in facilitating/influencing behavior changes; study current examples of successful social marketing initiatives; and discuss the ethics surrounding health communication and social marketing efforts.

Computer Programming for Public Health
PBHS 34400
COURSE INSTRUCTOR: Jason Edelstein
Day/Time: T 5-7:50pm
PQ: This course will provide an introductory and intermediate level overview of computer science and programming skills. Students will learn concepts in computer programming and how programming language works, as well as theories behind information system design and management. Specific topics include: Python and R programming language, data structures and management, algorithm design, data visualizations, and basic project management for reproducible research.

Economic Analysis of Health Policies
PBHS 38010
COURSE INSTRUCTOR: Tamara Konetzka
DAY & TIME: M/W 1:30-2:50pm
PQ: Microeconomics course recommended; Consent of instructor for undergrads.
CROSS-LIST ID: HLTH 28010; PPHA 38290
This course covers the foundations of the economics of health care as applied to current issues of health care policy. Content includes demand for health, medical care, and insurance; supply of medical care and behavior of health care practitioners; and economic perspectives on measurement in health care research. Using a combination of lectures, readings, problem sets, and discussion of newspaper and journal articles, the goal is for students to acquire a basic understanding of economic knowledge and thinking and to be able to apply that knowledge in analyzing policies. The course is open to graduate students and a limited number of undergraduates. A prior course in microeconomics is
recommended; for those students without this preparation, the beginning of the course will include a short primer on key concepts in microeconomics.

**MPH Capstone**  
PBHS 39300  
COURSE INSTRUCTOR: David Moskowitz  
DAY & TIME: TBD  
PQ: MPH students only; or consent of instructor

**Applied Bayesian Modeling and Inference**  
PBHS 43010  
COURSE INSTRUCTOR: Yuan Ji  
DAY & TIME: T/Th 12:30-1:50pm or 2-3:30pm  
PQ: STAT 24400 and STAT 24500 or master level training in statistics.  
CROSS-LIST ID: STAT 35920  
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: Kazuo Yamaguchi  
DAY & TIME: W 1:30-4:20pm  
PQ: Intermediate statistics or equivalent such as PBHS 32400, PBHS 32410, PPHA 31301, BUS 41100 or SOCI 30005.  
CROSS-LIST 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.
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Spring 2023

Introduction to Infectious Disease Epidemiology
PBHS 31300
COURSE INSTRUCTOR: Maria Pyra
DAY & TIME: M/W 1:30-2:50pm
PQ: PBHS 30910 (STAT 22810/ENST 27400/HLTH 20910/PPHA 36410) or introductory epidemiology course
CROSS-LIST ID: BIOS 25419

This intermediate-level course will build off basic epidemiology foundations to understand principles of infectious disease epidemiology as well as focus on specific diseases & their public health significance. We will examine disease transmission and the interactions between pathogens, hosts, and environment. This course introduces key pathogens, diagnostics, and immune responses. In addition, we will explore the roles of climate change, globalization, and social determinants of health on infectious diseases. Students will learn about research and public health responses to infectious diseases, including study design, modeling, molecular epidemiology, surveillance, outbreak investigation, and prevention.

Global Health Metrics
PBHS 31900
COURSE INSTRUCTOR: Kavi Bhalla
DAY & TIME: T/Th 11a-12:20p
PQ: Consent of instructor for undergrads (limited to 3rd & 4th yr undergrads)
CROSS-LIST ID: HLTH 27905; PBPL 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-fatality 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.

Biostatistical Methods
PBHS 32700
COURSE INSTRUCTOR: Lin Chen
DAY & TIME: T/Th 12:30-1:50pm
PQ: PBHS 32400, PBHS 32410 or STAT 24500; or equivalent; or consent of instructor
CROSS-LIST 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.

Sexual Health: Identity, Behavior, and Outcomes
PBHS 33700
COURSE INSTRUCTOR: David Moskowitz
DAY & TIME: M/W 4:30-5:50pm
PQ: PBHS 23700; GNSE 23702, GNSE 33702; HLTH 23700

Sexual health is a growing component of public health outreach. The goal of this course is to provide students with a foundational understanding of sexual health from a public health perspective. Through participation in this course, students will increase their knowledge about the history of sexual health promotion in the public health sphere. They will delve into sexual and gender identity construction and explore identity-behavioral expressions. They will critically examine and discuss common sexual health issues addressed by public health practitioners, their epidemiology, and their underlying social determinants; a global health lens will be applied to such examinations. Additionally, recognition of the key methodological considerations in the measurement of sexual behavior and sexual health outcomes will be elucidated (including strengths and limitations of various methodological approaches—quantitative, qualitative, clinical, and biomedical). By the completion of the course, students should be able to demonstrate knowledge and application of key theoretical foundations of sexual health promotion and sexual health behavior change and be able to promote sexual health messages through marketing and dissemination. From a policy perspective, student can expect an increased knowledge about issues related to social and legislative policy analyses, their applications, and implications.
Public Health Programs: Planning, Implementation & Evaluation
PBHS 34300
COURSE INSTRUCTOR:  David Moskowitz
DAY & TIME:  M/W 10:30-11:50am
PQ: MPH Student Only; or Consent of Instructor
The course is designed to provide students with an overview of how to develop public health programs and interventions. Students will learn the best ways to help solve the critical health issues affecting our communities at local, national, and international levels. Students will learn the start-to-finish processes of public health programming including understanding the problem using existent data, needs assessments/surveillance, using goals/objectives, basic design, message construction, planning, implementation, and creating an evaluation system that links back to goals/objectives. The course will also include an overview of effective evidence-based public health interventions that span multiple health domains and delivery modalities. Students will have the opportunity to create their own health programs through the quarter.

Machine Learning for Public Health
PBHS 34500
COURSE INSTRUCTOR:  Eric Polley
DAY & TIME:  T/Th 2-3:20pm
PQ: PBHS 32400/STAT 22400 or PBHS 32410 or equivalent AND PBHS 34400 or equivalent programming course. Limited to MPH Students; Consent of Instructor for PBHS Graduate and Doctoral Students
This course provides an introduction to machine learning in the context of public health and medical applications. Key concepts in the design and evaluation of machine learning algorithms will be presented. A variety of algorithms will be covered (e.g. random forests, splines, boosting, neural networks, and ensembles) and include hands-on experience with programming in R.

Health Services Research Methods
PBHS 35100
COURSE INSTRUCTOR: Prachi Sanghavi
DAY & TIME:  M/W 1:30-2:50pm
PQ: At least one course in linear regression and basic familiarity with STATA; or consent of instructor. CROSS-LIST ID: HLTH 29100; PPHA 38010; SSAD 46300; 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.

MPH Capstone
PBHS 39300
COURSE INSTRUCTOR: David Moskowitz
DAY & TIME:  TBD
PQ: MPH students only; or consent of instructor