DEPARTMENT OF PUBLIC HEALTH SCIENCES

Chair
• Diane S. Lauderdale

Professors
• Habibul Ahsan
• James J. Dignam
• Robert D. Gibbons, Medicine
• Donald Hedeker
• Dezheng Huo
• Yuan Ji
• R. Tamara Konetzka
• Benjamin B. Lahey
• Diane S. Lauderdale
• Harold Pollack, School of Social Service Administration
• John A. Schneider, Medicine

Associate Professors
• Kavi Bhalla
• Lin Chen
• Brian Chiu
• Brandon Pierce
• Eric Polley
• Mei-Yin Polley

Assistant Professors
• Aresha Martinez-Cardoso
• Prachi Sanghavi
• Loren Saulsberry
• Marcia Tan

Case Senior Scientist
• Jonathan Ozik, Argonne National Laboratory

Public Health Sciences (PHS) is the home in the Biological Sciences Division to biostatistics, epidemiology and health services research. These core fields in public health research share a focus on the development and implementation of complex analytic methods to understand the determinants of health, the efficacy of experimental treatments, and the structure of health care at the population level. Bringing together these fields in one department underscores their commonality and enhances opportunities for interdisciplinary research. Faculty members lead local, national, and international studies, and also welcome opportunities to collaborate with faculty across the Biological Sciences Division and the university. Substantively, our research themes include social and environmental determinants of health, genetics and disease, the economics of health care, and the evaluation and implementation of new technologies in public health and clinical care. In terms of methodological expertise, areas in which our faculty has developed innovative approaches include: risk factor measurement; multilevel, clustered and longitudinal data; clinical trials; administrative health data; social networks; and statistical methods to assess the genetic and molecular basis of disease.

PROGRAM OF STUDY

Currently, the Department of Public Health Sciences offers the Master of Science in Public Health Sciences for Clinical Professionals, the Master of Public Health (MPH)/(MD-MPH), and a Ph.D. program. Current information on graduate programs is available from the department’s website at http://health.uchicago.edu/health.bsd.uchicago.edu/.

THE DEGREE OF DOCTOR OF PHILOSOPHY

The Department of Public Health Sciences at the University of Chicago offers a program of study leading to the Ph.D. with emphasis in biostatistics, epidemiology or health services research. This program will
prepare individuals for research careers in population-based research in human health and biomedical science. The program is organized around a common quantitative core curriculum designed to prepare students methodologically for more in-depth study in their chosen field and for dissertation research. Beyond the core curriculum, each student will choose a major disciplinary area of concentration, take a sequence of advanced courses in that area, and prepare a dissertation of independent, original, and rigorous research. Opportunities for such concentrated study will be available in the three broad areas of biostatistics, epidemiology and health services research, areas of expertise represented by department faculty.

In addition to the concentration, each student will choose a minor program of study in another area either represented by department faculty or offered elsewhere in the Biological Sciences Division or on campus. Tailored to each individual student, the minor will vary in its degree of specificity from student to student. It may be in one of the broad areas represented by the department, or in a more specialized area. Examples of specialized minors include psychiatric or cancer epidemiology, health economics, economics of aging, clinical trials design, cancer biology, genetic or molecular epidemiology, bioinformatics, or medical decision theory.

**PROGRAM REQUIREMENTS**

Students should expect to complete the program in 5 years by fulfilling the following requirements:

- Complete 18 graduate level courses, including:
  - A core curriculum of up to six courses.
  - A major concentration program approved by the faculty consisting of at least 7 additional courses in a disciplinary domain (such as biostatistics).
  - A minor program approved by the faculty consisting of at least 3 additional courses in a second disciplinary area.
- Successfully complete a course in scientific integrity and the ethical conduct of research, usually in the first year of study (divisional ethics requirement).
- Pass a multi-part preliminary examination demonstrating mastery of the core curriculum and of foundational knowledge in the chosen area of concentration.
- Teach two quarters for credit in pre-approved teaching assistant positions in the biological sciences (divisional teaching requirement).
- Establish a doctoral dissertation committee, present proposed dissertation research to members of that committee and other interested faculty, and obtain written approval from the committee on the proposed dissertation research.
- Prepare and defend a doctoral dissertation of independent, original, and rigorous research in the chosen area of concentration.
- Participate in the departmental seminar, in weekly faculty/student workshops, and in research workshops that overlap with the chosen area of concentration.

**REQUIRED COURSES**

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**APPLICATION FOR ADMISSION**

Applications for the PhD program should be received by December 1st for matriculation in Autumn Quarter and should consist of a BSD application (including three letters of recommendation), uploaded official transcript(s) from all degree institutions, GRE scores (optional), TOEFL scores (if applicable), CV/detailed relevant work history, a personal statement, and a research statement indicating area of major concentration.

Interested students should visit the department website at https://pbhs.uchicago.edu.

**MASTER OF PUBLIC HEALTH (MPH)**

The Department of Public Health Sciences at the University of Chicago offers a program of study leading to the degree of Master of Public Health. This program will prepare individuals for careers as public health professionals or researchers. The program follows a competency-based curriculum that provides proficiency in several public health disciplines, including biostatistics, epidemiology, health policy and management, social and behavioral sciences, and environmental health sciences. Beyond the core curriculum, each student will choose an
area of concentration and complete a sequence of advanced courses in that area. Areas of concentration include epidemiology and global health, health policy, and data science.

All students will complete a practicum experience, gaining hands-on training in public health research or applied public health practice, depending on the individual student's career goals. The practicum may be completed with internal partners at the University of Medical Center, or with external partners in a range of public health settings. Students will work with program staff and faculty to identify an appropriate host site. The practicum experience is expected to include an average of 80-100 hours of hands-on public health or research experience.

PROGRAM REQUIREMENTS

The full-time program can be completed in as few as 5 academic quarters (4 full-time quarters and the summer practicum experience). Part-time options are also available. The following requirements must be fulfilled:

Complete 13 graduate level courses, including:

- A core curriculum of nine courses, including a practicum and a capstone course
- A concentration consisting of four additional courses in the chosen field

The capstone project will include both a final paper and presentation. The culminating project may be research-based or applied, depending on the student’s interests and career objectives. Students will work with a faculty mentor who will provide guidance and feedback throughout the capstone experience.

Students are also encouraged to participate in departmental seminars, in weekly faculty/student works, and in research workshops that are of interest.

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APPLICATION FOR ADMISSION

The MPH program recognizes application deadlines of December 1 and March 1 for matriculation in Autumn Quarter. Late applications may be accepted after March 1 as space permits. The application consists of an online application, copies of transcripts from all postsecondary education, TOEFL or IELTS scores (if applicable), three letters of recommendation, resume or curriculum vitae, and a personal statement.

Interested students should visit the program website at https://publichealth.bsd.uchicago.edu/.

DOCTOR OF MEDICINE - MASTER OF PUBLIC HEALTH (MD-MPH)

The Department of Public Health Sciences at the University of Chicago offers a program of study in partnership with the Pritzker School of Medicine that leads to the joint degree of Doctor of Medicine-Master of Public Health (MD-MPH). The program is designed for medical students with an interest in public health. Graduates of the program will be trained as physicians prepared for research and leadership positions in a variety of healthcare settings.

The MD-MPH is a five-year program requiring 1100 units of MPH coursework in addition to the MD curriculum at the Pritzker School of Medicine. Students first complete three years of coursework at the medical school. Medical students interested in pursuing the joint degree are encouraged to apply to the MPH program during the Autumn Quarter of their third year of medical school. Students accepted into the MPH program will leave the medical school following their third year to pursue full-time MPH coursework for one year. In the final year, students finish their fourth year of medical school requirements and the MPH capstone project.

PROGRAM REQUIREMENTS

Students must complete all requirements of the MD curriculum set forth by the Pritzker School of Medicine, as outlined here: http://graduateannouncements.uchicago.edu/graduate/thepritzkerschoolofmedicine/.
The program requires completion of 11 graduate level courses beyond the MD curriculum to count towards the MPH, including:

- A **core curriculum** of seven courses*
- A **concentration** consisting of four additional courses in the chosen field

*Two courses from the MD curriculum, The American Healthcare System and Health Care Disparities in America: Equity and Advocacy, count towards both the MD and MPH requirements, reducing the number of additional core courses in the MPH curriculum.

The capstone project will include both a final paper and presentation. The culminating project may be research-based or applied, depending on the student's interests and career objectives. Students will work with a faculty mentor who will provide guidance and feedback throughout the capstone experience.

Students are also encouraged to participate in departmental seminars, in weekly faculty/student works, and in research workshops that are of interest.

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<td>MEDC 30710</td>
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<td>MEDC 60407</td>
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**APPLICATION FOR ADMISSION**

Applications for the MD-MPH program are due by January 15 for matriculation in Autumn Quarter. Interested students are encouraged to apply during the autumn quarter of their third year at Pritzker. Students should first speak with the Pritzker Dean of Students and obtain a signed Letter of Good Standing to accompany their application. In addition to this letter, the application includes an online application, transcript from the Pritzker School of Medicine, one letter of recommendation from a current Pritzker faculty member, resume or curriculum vitae, and a personal statement.

Interested students should visit the program website at [https://publichealth.bsd.uchicago.edu/](https://publichealth.bsd.uchicago.edu/).
PBHS 32100  Introduction to Biostatistics *
PBHS 32410  Regression Analysis for Health and Social Research

One of the following courses:  
PBHS 35100  Health Services Research Methods  
PBHS 35500  Introduction to U.S. Health Policy and Politics

One of the following courses:  
PBHS 32600  Analysis of Categorical Data  
PBHS 32700  Biostatistical Methods  
PBHS 33300  Applied Longitudinal Data Analysis

And three electives

Total Units

*  STAT 22000 or equivalent can be substituted for this course.

APPLICATION FOR ADMISSION

Applications for the Master of Science in Public Health Sciences for Clinical Professionals program should be completed by December 1st for matriculation in Autumn Quarter.

If the degree program will be pursued while the candidate will be participating in a clinical training program, a letter of support from the training program director is required. Candidates must also submit a statement describing how the proposed course of study will enhance their professional objectives. In addition, candidates must provide transcripts from all post secondary institutions, MCAT or GRE scores, and a completed Biological Sciences Division application.

Interested students should visit the department website at http://health.uchicago.edu (http://health.bsd.uchicago.edu).

PUBLIC HEALTH SCIENCES COURSES

PBHS 30910. Epidemiology and Population Health. 100 Units.
This course does not meet requirements for the biological sciences major. Epidemiology is the study of the distribution and determinants of health and disease in human populations. This course introduces the basic principles of epidemiologic study design, analysis, and interpretation through lectures, assignments, and critical appraisal of both classic and contemporary research articles.
Instructor(s): D. Lauderdale Terms Offered: Autumn
Prerequisite(s): STAT 22000 or other introductory statistics highly desirable. For BIOS students-completion of the first three quarters of a Biological Sciences Fundamentals sequence.
Equivalent Course(s): HLTH 20910, PPHA 36410, STAT 22810, ENST 27400

PBHS 31001. Epidemiologic Methods. 100 Units.
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.
Instructor(s): B. Chiu Terms Offered: Winter
Prerequisite(s): PBHS 30910 AND PBHS 32400 or applied statistics courses through multivariate regression.
Equivalent Course(s): STAT 35700

PBHS 31200. Cancer Epidemiology. 100 Units.
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.
Instructor(s): B. Chiu Terms Offered: Winter. Not offered in 2021-22
Prerequisite(s): PBHS 30910

PBHS 31300. Introduction to Infectious Disease Epidemiology. 100 Units.
This intermediate-level epidemiology course directed by two infectious disease epidemiologist-physicians will provide an up to date perspective on forgotten, contemporary and emerging infections. The course lectures and readings will provide a rigorous examination of the interactions among pathogens, hosts and the environment that produce disease in diverse populations. In addition to the demographic characteristics and the behaviors of individuals that are associated with a high risk of infection, we will examine complex aspects of the environment as they pertain to disease transmission. These include poverty, globalization, social networks, public health, and racial and ethnic disparities. Methodologic approaches to infectious disease epidemiology that will be covered include traditional study designs, molecular epidemiology, social network analysis, modeling, and network science. Local and global approaches will be applied to case studies from the United States, Asia, and Africa.
Instructor(s): M. Pyra Terms Offered: Spring
Prerequisite(s): Biology majors: Three quarters of a Biological Sciences Fundamentals sequence. PBHS 30910 or introductory epidemiology or consent of instructor
Equivalent Course(s): MEDC 31300, CCTS 43200, BIOS 25419

PBHS 31450. Social Inequalities in Health: Race/Ethnicity & Class. 100 Units.
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.
Instructor(s): Aresha Martinez-Cardoso Terms Offered: Spring
Equivalent Course(s): HLTH 27450

PBHS 31510. Critical Readings in Epidemiology. 100 Units.
Course consists of reading and critiquing important and innovative recent papers in epidemiology. Each week, there will be a different substantive or disease focus for the papers. Research areas covered will be primarily, but not exclusively, in noninfectious diseases. Different faculty will lead the discussion each week and students will prepare and present summary critiques of the articles.
Instructor(s): TBN Terms Offered: TBD
Prerequisite(s): PBHS 30910

PBHS 31710. Environmental Epidemiology. 100 Units.
Course description is forthcoming.
Instructor(s): B. Aschebrook-Kilfoy Terms Offered: Spring

PBHS 31831. Genetic & Molecular Epidemiology. 100 Units.
This course is designed for students with strong research interests related to identifying and characterizing the role of genetic and molecular features in human disease. Students will be introduced to the key concepts and methodological issues encountered in epidemiological studies that utilize genetic and molecular data. This course will train students on the theoretical and practical aspects of study design and data generation, and also provide the relevant hands-on training for quality control, management, and analysis of large-scale genomic/molecular data. Students are expected to have taken prior coursework in epidemiology, biostatistics, and genetics.
Instructor(s): B. Pierce Terms Offered: Spring
Prerequisite(s): PBHS 30910 (or introductory epidemiology) AND HGEN 47000 or consent of instructor.

PBHS 31900. Global Health Metrics. 100 Units.
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.
Instructor(s): Kavi Bhalla Terms Offered: Spring
Prerequisite(s): N/A
Equivalent Course(s): HLTH 27905, PBHS 27900, PBPL 27905

PBHS 32100. Introduction to Biostatistics. 100 Units.
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 logistics regression.
Instructor(s): J. Cursio Terms Offered: Autumn
Prerequisite(s): 2 quarters of pre-calculus
Note(s): *In addition to the course, there is a statistical computing workshop.
Equivalent Course(s): CCTS 45000

PBHS 32400. Applied Regression Analysis. 100 Units.
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. Prerequisite: PBHS 32100. Equivalent Course(s): PBHS 32400
Terms Offered: Autumn Spring
Prerequisite(s): STAT 22000 or 23400 with a grade of at least C+, or STAT 22200 or 22600 or 24500 or 24510 or PBHS 32100, or AP Statistics credit for STAT 22000. Also two quarters of calculus (MATH 13200 or 15200 or 15300 or 16200 or 16210 or 15910 or 18300 or 19520 or 19620 or 20250 or 20300 or 20310).
Equivalent Course(s): STAT 22400

**PBHS 32410. Regression Analysis for Health and Social Research. 100 Units.**

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. Instructor(s): James Dignam Terms Offered: Winter
Prerequisite(s): PBHS 32100 or STAT 22000 or equivalent
Equivalent Course(s): STAT 22401

**PBHS 32600. Analysis of Categorical Data. 100 Units.**

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.
Terms Offered: Winter
Prerequisite(s): STAT 22000 or 23400 with a grade of at least C+, or STAT 22200 or 22400 or 24500 or 24510 or PBHS 32100, or AP Statistics credit for STAT 22000. Also two quarters of calculus (MATH 13200 or 15200 or 15300 or 16200 or 16210 or 15910 or 18300 or 19520 or 19620 or 20250 or 20300 or 20310).
Equivalent Course(s): STAT 22600

**PBHS 32700. Biostatistical Methods. 100 Units.**

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. This course emphasizes application of the methodology rather than statistical theory (e.g., 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, and Poisson regression.
Instructor(s): L. Chen Terms Offered: Spring
Prerequisite(s): PBHS 32400, STAT 22400 or STAT 24500 or equivalent or consent of instructor.
Equivalent Course(s): STAT 22700

**PBHS 32901. Introduction to Clinical Trials. 100 Units.**

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.
Instructor(s): M. Polley Terms Offered: Winter
Prerequisite(s): PBHS 32100 and STAT 22000; Introductory Statistics or Consent of Instructor
Equivalent Course(s): STAT 35201

**PBHS 33300. Applied Longitudinal Data Analysis. 100 Units.**

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 studies, 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.
Instructor(s): D. Hedeker Terms Offered: Spring
Prerequisite(s): PBHS 32400/STAT 22400 or equivalent, and PBHS 32600/STAT 22600 or PBHS 32700/STAT 22700 or equivalent; or consent of instructor.
Equivalent Course(s): CHDV 32501, STAT 36900

**PBHS 33400. Multilevel Modeling. 100 Units.**

This course will focus on the analysis of multilevel data in which subjects are nested within clusters (e.g., health care providers, hospitals). The focus will be on clustered data, and several extensions to the basic two-level multilevel model will be considered including three-level, cross-classified, multiple membership, and multivariate models. In addition to models for continuous outcomes, methods for non-normal outcomes will be covered, including multilevel models for dichotomous, ordinal, nominal, time-to-event, and count outcomes. Some statistical theory will be given, but the focus will be on application and interpretation of the statistical analyses.
Instructor(s): D. Hedeker Terms Offered: Autumn
Prerequisite(s): PBHS 32400 and PBHS 32700 or consent of instructor.
PBHS 33500. Statistical Applications. 100 Units.
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.
Instructor(s): R. Gibbons Terms Offered: Autumn
Prerequisite(s): PBHS 32700/STAT 22700 or STAT 34700 or consent of instructor.
Equivalent Course(s): STAT 35800, CHDV 32702

PBHS 34100. Foundations of Public Health. 100 Units.
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.
Instructor(s): David Moskowitz Terms Offered: Autumn
Prerequisite(s): MPH students only; or consent of instructor

PBHS 34200. Health Communication & Health Behavior Theory. 100 Units.
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.
Instructor(s): David Moskowitz Terms Offered: Winter
Prerequisite(s): MPH Students Only; or Consent of Instructor

PBHS 34300. Public Health Programs: Planning, Implementation & Evaluation. 100 Units.
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, plan design/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.
Instructor(s): David Moskowitz Terms Offered: Spring
Prerequisite(s): MPH Students Only; or Consent of Instructor

PBHS 34400. Computer Programming for Public Health. 100 Units.
Course description forthcoming.
Instructor(s): TBN Terms Offered: Winter

PBHS 34500. Machine Learning for Public Health. 100 Units.
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.
Instructor(s): E. Polley Terms Offered: Spring
Note(s): Limited to MPH Students; Consent of Instructor for PBHS Graduate and Doctoral Students

PBHS 34600. Qualitative Methods for Health Research. 100 Units.
This course is designed to train students in qualitative research methodology, from conceptualization, through design and data collection processes. It includes an in-depth discussion of qualitative research design and the role of theory in guiding and informing a research project. Students will learn to delineate research problems and design considerations that are best suited for qualitative over quantitative methods. Specifically, the course focuses on training, through lecture, group work and hands-on experiences, across four data collection
methods commonly used in qualitative research: observation, interview, focus group, and use of existing qualitative data. Students will undertake a pilot research study as a means of practicing their qualitative research conceptualization and data collection skills. Multiple data analyses techniques (e.g., content analysis, narrative analysis) will be explained.

Instructor(s): David Moskowitz Terms Offered: Winter

**PBHS 35000. Fundamentals of Health Services Research: Theory, Methods and Applications. 100 Units.**

This course is designed to provide an introduction to the fundamentals of health services research. The basic concepts of health services research will be taught with an emphasis on both their social scientific foundations and the methods needed for their practical application to empirically relevant research. Theoretical foundations will draw on principles from economics, sociology, psychology, and the other social sciences. Methodological topics to be covered will include techniques for data collection and analysis, including outcomes measurement, survey methods, large data set research, population-based study design, community based participatory research, research based in clinical settings, qualitative methods, cost-effectiveness analysis, and tools of economic and sociological analysis. The theoretical and empirical techniques taught will emphasize those relevant to the examination of health care costs, quality, and access. Major applications will include: measurement and improvement of health care quality, analysis of health disparities, analysis of health care technology, and analysis of health care systems and markets. Students prepare a grant proposal as the final assignment for this course.

Instructor(s): D. Meltzer, M. H. Chin Terms Offered: Summer
Equivalent Course(s): CCTS 45200, PPHA 47900

**PBHS 35100. Health Services Research Methods. 100 Units.**

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.

Instructor(s): P. Sanghavi Terms Offered: Spring
Prerequisite(s): At least one course in linear regression and basic familiarity with STATA; or consent of instructor.
Equivalent Course(s): SSAD 46300, PPHA 38010, HLTH 29100

**PBHS 35500. Introduction to U.S. Health Policy and Politics. 100 Units.**

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.

Instructor(s): Loren Saulsberry Terms Offered: Autumn
Prerequisite(s): None
Equivalent Course(s): PPHA 37720, PBHS 28500, SSAD 45011, HLTH 25500

**PBHS 38010. Economic Analysis of Health Policies. 100 Units.**

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.

Instructor(s): T. Konetzka Terms Offered: Winter
Note(s): Microeconomics course recommended
Equivalent Course(s): PPHA 38290, HLTH 28010

**PBHS 38400. Advanced Topics in Health Economics. 100 Units.**

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).

Instructor(s): T. Konetzka Terms Offered: Winter. Not offered in 2021-22
Prerequisite(s): Graduate courses in microeconomics and econometrics or statistics, including the use of linear and nonlinear regression methods.

**PBHS 39000. Master’s Readings: Public Health Sciences. 300.00 Units.**

Arrange course content and meeting times with instructor.
PBHS 39100. Master's Research: Public Health Sciences. 300.00 Units.
Arrange course content and meeting times with instructor.

PBHS 39200. MPH/MD-MPH Capstone Writing and Presentation. 100 Units.
Capstone writing and presentation.
Instructor(s): TBD

PBHS 39300. MPH/MD-MPH Practicum. 100 Units.
The practicum experience provides an opportunity for students to demonstrate mastery of core competencies and potential for future success as a public health professional or researcher.
Instructor(s): TBN

PBHS 40000. Public Health Sciences PhD Research & Training. 300.00 Units.
Arrange course content and meeting times with instructor.

PBHS 40100. Advanced Topics in Ethics for Public Health Sciences. 100 Units.
Arrange course content and meeting times with instructor.

PBHS 40500. Advanced Epidemiologic Methods. 100 Units.
This course examines some features of study design, but is primarily focused on analytic issues encountered in epidemiologic research. The objective of this course is to enable students to conduct thoughtful analysis of epidemiologic and other population research data. Concepts and methods that will be covered include: matching, sampling, conditional logistic regression, survival analysis, ordinal and polytomous logistic regressions, multiple imputation, and screening and diagnostic test evaluation. The course follows in sequence the material presented in "Epidemiologic Methods."
Instructor(s): D. Huo Terms Offered: Spring
Prerequisite(s): PBHS 31001

PBHS 43010. Applied Bayesian Modeling and Inference. 100 Units.
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.
Instructor(s): Y. Ji Terms Offered: Winter
Prerequisite(s): STAT 24400 and STAT 24500 or master level training in statistics.
Equivalent Course(s): STAT 35920

PBHS 43201. Introduction to Causal Inference. 100 Units.
This course is designed for graduate students and advanced undergraduate students from the social sciences, education, public health science, public policy, social service administration, and statistics who are involved in quantitative research and are interested in studying causality. The goal of this course is to equip students with basic knowledge of and analytic skills in causal inference. Topics for the course will include the potential outcomes framework for causal inference; experimental and observational studies; identification assumptions for causal parameters; potential pitfalls of using ANCOVA to estimate a causal effect; propensity score based methods including matching, stratification, inverse-probability-of-treatment-weighting (IPTW), marginal mean weighting through stratification (MMWS), and doubly robust estimation; the instrumental variable (IV) method; regression discontinuity design (RDD) including sharp RDD and fuzzy RDD; difference in difference (DID) and generalized DID methods for cross-section and panel data, and fixed effects model. Intermediate Statistics or equivalent such as STAT 224/PBHS 324, PP 31301, BUS 41100, or SOC 30005 is a prerequisite. This course is a prerequisite for "Advanced Topics in Causal Inference" and "Mediation, moderation, and spillover effects."
Instructor(s): Kazuo Yamaguchi
Prerequisite(s): Intermediate Statistics or equivalent such as STAT 224/PBHS 324, PP 31301, BUS 41100, or SOC 30005
Note(s): CHDV Distribution: M; M
Equivalent Course(s): PLSC 30102, STAT 31900, SOCI 30315, CHDV 30102, MACS 51000

PBHS 45610. Policy Analysis: Meths/Apps. 100 Units.
This master's-level course provides students with the basic tools of policy analysis. Students will learn and apply tools of decision analysis in written group assignments and in an accompanying computer lab. Students will also learn and apply concepts of cost-effectiveness, cost-benefit, and cost-utility analysis with social service, medical, public health applications. Doctoral students and master’s students who intend to take the course Advanced Applications of Cost-Effectiveness Analysis in Health will complete two additional laboratory assignments.
Topics to be covered include: Decision trees for structured policy analysis, the economic value of information, analysis of screening programs for HIV and child maltreatment, sensitivity analysis, cost-effectiveness analysis of life-saving interventions and programs to reduce behavioral risk, valuing quality of life outcomes, ethical issues in cost-benefit analysis, analysis of irrational risk behaviors. Substantive areas covered include: HIV/substance use prevention, school-based prevention of sexual risk, smoking cessation, and housing policy. In the associated learning lab, students will use computer decision software to build and analyze decision trees in policy-relevant examples. They will conduct one-way and two-way sensitivity analysis to explore the impact of key parameters
on cost-effectiveness of alternative policies. Students will receive an introduction to dynamic modeling in the context of HIV prevention, cancer screening, and transportation programs. Equivalent Course(s): PPHA 40101, SSAD 45600

PBHS 49000. Ph. D. Rdgs: Public Health Sciences. 300.00 Units. Arrange course content and meeting times with instructor.

PBHS 49100. Ph. D. Rsch: Public Health Sciences. 300.00 Units. Arrange course content and meeting times with instructor.

PBHS 70000. Advanced Study: Public Health Sciences. 300.00 Units. Advanced Study: Public Health Sciences