Department of Public Health Sciences

Chair

- Diane S. Lauderdale

Professors

- Habibul Ahsan
- Brian Chiu
- James J. Dignam
- Robert D. Gibbons, Medicine
- Donald Hedeker
- Elbert Huang, Medicine
- Dezheng Huo
- Yuan Ji
- R. Tamara Konetzka
- Diane S. Lauderdale
- Brandon Pierce
- Harold Pollack, Crown Family School of Social Work, Policy and Practice
- John A. Schneider, Medicine
- Jasmin Tiro

Associate Professors

- Briseis Aschebrook-Kilfoy
- Kavi Bhalla
- Lin Chen
- David Kim, Medicine
- Eric Polley
- Mei-Yin Polley

Assistant Professors

- Joseph Bruch
- Kate Burrows
- Betsy Cliff
- Rebekah Israel Cross
- Aresha Martinez-Cardoso
- Olga Morozova
- William Parker, Medicine
- Prachi Sanghavi
- Loren Saulsberry
- Marcia Tan

Senior Instructional Professor

- David Moskowitz

Assistant Instructional Professor

- Seleeke Flingai

CASE Senior Scientist

- Jonathan Ozik, Argonne National Laboratory

Public Health Sciences (PHS) is the home in the Biological Sciences Division to public health core fields of 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 (but are not limited to) 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/ (http://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, health services research, or other areas of population health. 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, health services research, and other areas of population health, in which our department faculty have expertise.

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 16 graduate level courses, including:

- A *core curriculum* of up to six courses
- A course in scientific integrity and the ethical conduct of research
- 9 additional courses courses, including
  - A *major concentration program* of at least 6 additional courses
  - A *minor program* of at least 2 additional courses
  - At least one course with a significant focus on health equity and/or disparities

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

PBHS 30910	Epidemiology and Population Health	100
PBHS 31001	Epidemiologic Methods	100
PBHS 32410	Regression Analysis for Health and Social Research	100
PBHS 32700	Biostatistical Methods	100

PBHS 35100	Health Services Research Methods	100
PBHS 35500	Introduction to U.S. Health Policy and Politics	100

Students focusing on biostatistics will substitute more advanced courses for their core courses in biostatistics.

Application for Admission

Applications for the PhD program should be received by the annual deadline (https://biosciences.uchicago.edu/admissions/how-to-apply/) for matriculation in Autumn Quarter and should consist of a BSD application (including three letters of recommendation), uploaded copies of 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 and subject areas, including biostatistics, epidemiology, health policy and management, social and behavioral sciences, health equity, community health, 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: (1) epidemiology and global health, (2) health policy, (3) data science, and (4) community health promotion.

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 is usually completed with external partners in a range of public health settings, but may also include internal partners at the University of Chicago Medical Center. 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 is designed to be completed in 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 eight courses
- A *concentration* consisting of three additional courses in the chosen field
- Two *electives* of the student's choosing

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 faculty/student works, and in research workshops that are of interest.

Required courses

PBHS 30910	Epidemiology and Population Health	100
PBHS 31450	Social Inequalities in Health: Race/Ethnicity & Class	100
PBHS 32100	Introduction to Biostatistics	100
PBHS 34100	Foundations of Public Health	100
PBHS 34200	Health Communication & Health Behavior Theory	100
PBHS 34300	Public Health Programs: Planning, Implementation & Evaluation	100
PBHS 35500	Introduction to U.S. Health Policy and Politics	100
PBHS 39200	Public Health in Practice	100

Application for Admission

The MPH program recognizes application deadlines of January 15 and March 15 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. Applications for the MPH program are made through SOPHAS, the centralized application service for public health.

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 through SOPHAS during 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 six courses*
- A *concentration* consisting of three additional courses in the chosen field
- One *elective of the student's choosing*

*Components of the MD curriculum substitute for two core MPH courses, reducing the number from eight to the six listed below. The two core courses MD/MPH are not required to take are: "Social Inequalities in Health: Race/Ethnicity & Class" and "Introduction to U.S. Health Policy and Politics".

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 faculty/student works, and in research workshops that are of interest.

Required Courses

PBHS 30910	Epidemiology and Population Health	100
PBHS 32100	Introduction to Biostatistics	100
PBHS 34100	Foundations of Public Health	100
PBHS 34200	Health Communication & Health Behavior Theory	100
PBHS 34300	Public Health Programs: Planning, Implementation & Evaluation	100
PBHS 39200	Public Health in Practice	100

Application for Admission

Applications for the MD-MPH program are due January 15 or March 15 for matriculation in Autumn Quarter. Interested students are encouraged to apply by January 15 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/.

Master of Science in Public Health Sciences for Clinical Professionals

The Master of Science Program for Clinical Professionals is a course of study in the theory, methods, and concepts of biostatistics, epidemiology, and health services research needed to design and carry out clinical epidemiologic and health services research programs. It is designed for the professional enhancement of physicians and other clinical professionals. The program can be completed in one year of full time study, but is more often undertaken in conjunction with a clinical fellowship or training program, in which case the course work may be distributed over two or three years. Students in the program acquire skills with basic statistical methods, followed by additional training in the fundamental theory and methods of epidemiology, biostatistics, and health services research. There is a broad choice of elective courses, allowing students to gain additional knowledge in their area of interest.

Entrance requirements

Applicants should either have a doctoral level clinical degree (such as M.D., D.O., or nursing Ph.D.) from an accredited institution, or must have completed pre-clinical training at an accredited medical school. In the latter case, the candidate must provide a plan for completion of both the M.D. and S.M. degrees, and a letter of support from the candidate's medical school. In exceptional circumstances, this program may be appropriate for other professionals who do not have a doctoral-level clinical degree. In that case, the potential applicant should meet with the program director prior to completing the application.

Program requirements

A candidate in this program for the degree of Master of Science in Public Health Sciences for Clinical Professionals must complete the six required and three elective courses (nine courses in total), and complete a master's paper.

Required courses

All of the following courses:		400
PBHS 30910	Epidemiology and Population Health	
PBHS 31001	Epidemiologic Methods	
PBHS 32100	Introduction to Biostatistics *	
PBHS 32410	Regression Analysis for Health and Social Research	
One of the following courses:		100
PBHS 35100	Health Services Research Methods	
PBHS 35500	Introduction to U.S. Health Policy and Politics	
An additional course in biostatistics, such as:		100
PBHS 32700	Biostatistical Methods	
PBHS 33300	Applied Longitudinal Data Analysis	
And three electives		300
Total Units		900

* 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 March 15 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.
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.
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, BIOS 27810, ENST 27400, PPHA 36410, STAT 22810

PBHS 31001. Epidemiologic Methods. 100 Units.
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.
Instructor(s): D. Huo Terms Offered: Winter

Prerequisite(s): PBHS 30910 and PBHS 32400/STAT 22400 or PBHS 32410 (taken concurrently) or applied statistics courses through multivariate regression.
Equivalent Course(s): STAT 35700

PBHS 31100. Introduction to Mathematical Modeling in Public Health. 100 Units.
Modeling is a simplified representation of reality that aims to capture essential features of a real-life object or process. Mathematical modeling in public health encompasses a wide array of methodologies offering a powerful toolkit to approach questions that would otherwise be extremely difficult or impossible to answer. This course will introduce students to the conceptual framework of mechanistic modeling and cover the most widely used mathematical modeling approaches in public health, including Markov models, queuing models, models of contagion, and a brief overview of network models and systems dynamic models. The course will explore differences, trade-offs and applications of discrete and continuous time models, deterministic and stochastic models, and compartmental and agent-based models, and will cover the basics of computational techniques used to calibrate models to data. The course will combine lectures and interactive computer / discussion sessions aimed to provide students with an opportunity to practice quantitative techniques covered in lectures and apply these methods to real-world problems.
Instructor(s): O. Morozova Terms Offered: Spring
Prerequisite(s): The course assumes that students have prior coursework in basic probability and statistics and have basic coding skills. Familiarity with R statistical computing environment is recommended but not required. Courses that would provide the appropriate background include BIOS 20151, STAT 22000, STAT 25100 and PBHS 32100. Undergraduates: First 3 quarters of a Biology Fundamentals Sequence.
Note(s): E. CB. GP.
Equivalent Course(s): BIOS 26311

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
Prerequisite(s): PBHS 30910
Note(s): Course not offered every year.

PBHS 31300. Introduction to Infectious Disease Epidemiology. 100 Units.
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.
Instructor(s): M. Pyra Terms Offered: Spring
Prerequisite(s): Biology majors: Three quarters of a Biological Sciences Fundamentals sequence. PBHS 30910 or introductory epidemiology.
Equivalent Course(s): MEDC 31300, 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: Autumn
Prerequisite(s): Introductory statistics course.
Equivalent Course(s): CRES 27450, HLTH 27450

PBHS 31710. Environmental Health. 100 Units.
This course provides an introduction to topics and methods in environmental epidemiology. Topical areas include selected air and water pollutants, radiation, pesticides, metals, environmental microbial exposures, persistent organic pollutants, endocrine-disrupting chemicals, disease clusters, disaster epidemiology, environmental justice, and climate change. Exposure assessment and statistical methods for evaluation of environmental and occupational factors will be considered in the context of specific applications.
Instructor(s): B. Aschebrook-Kilfoy Terms Offered: TBD
Prerequisite(s): Introductory statistics course recommended.
Equivalent Course(s): PBHS 22710

PBHS 31720. Climate Change and Human Health. 100 Units.
Climate change is one of the greatest global health threats facing the world in the 21st century. Through this course, students will gain foundational knowledge in the health effects of climate change. We will begin with several lectures on climate science as it related to the patterns of weather extremes experienced by populations. We will then identify the varying health outcomes linked to different climate-related exposures, emphasizing the specific impacts in vulnerable and high-risk populations. Specific topics include the effects of air pollution, extreme heat and heat waves, droughts, tropical cyclones, changes in vector habitats, and sea-level rise. Finally, we will discuss strategies for public health practitioners to aid communities in preventing or alleviating these adverse effects.
Instructor(s): K. Burrows Terms Offered: Autumn
Prerequisite(s): PBHS 32100 or STAT 22000 or introductory statistics
Equivalent Course(s): CEGU 21720, CEGU 31720, HLTH 21720

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
Note(s): PBHS 30910; Limited to 3rd & 4th yr undergrads
Equivalent Course(s): HLTH 27905, 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.

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 or (STAT 11800 & 11900) or ECON 11010 or BUSN 41000 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], and [MATH 13200/15200/15300/16200/16210/15910/18300/19520/19620/20250/20300 or 20310].
Note(s): Students may count either STAT 22400 or STAT 22401, but not both, toward the forty-two credits required for graduation.
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 or (STAT 11800 & 11900) or ECON 11010 or BUSN 41000 grade at least C +, or STAT 22400 or 22600 or 24500 or 24510 or PBHS 32100, or APStat credit STAT 22000] & [2 qtrs 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 or PBHS 32410 or STAT 22400 or STAT 24500 or equivalent.
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: Autumn
Prerequisite(s): PBHS 32100 or 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: Winter
Prerequisite(s): PBHS 32400/STAT 22400 or PBHS 32410 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 or PBHS 32410 and PBHS 32700 or consent of instructor.
Equivalent Course(s): CHDV 32401

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 32400, 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.

Equivalent Course(s): STAT 35800, CHDV 32702

PBHS 33700. Sexual Health: Identity, Behavior, and Outcomes. 100 Units.
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.
Instructor(s): David Moskowitz Terms Offered: Spring
Equivalent Course(s): HLTH 23700, GNSE 33702, PBHS 23700, GNSE 23702

PBHS 33800. Global Maternal and Child Health. 100 Units.
This course provides a foundation in global perspectives on maternal and child health research, practice, and policy. The course will cover a range of maternal and child health topics to examine critical challenges facing women, children, providers, and policymakers in some of the world's most vulnerable communities. Students in this course will: 1) understand the status of maternal and child health in a variety of communities and contexts, using key health and development indicators; 2) critically analyze past and present public health programs and policies utilized to address maternal and child health needs in diverse communities; 3) assess the economic, political, social, and cultural factors that affect maternal and child health programs and outcomes.
Instructor(s): E. Amick Terms Offered: Autumn
Equivalent Course(s): HLTH 23810, GNSE 23180, GNSE 33800

PBHS 33900. Introduction to Urban Health. 100 Units.
This seminar course will provide a broad overview of the political, economic, social, and physical conditions that impact the health of populations in urban settings. Using social epidemiological theories and the logics of racial capitalism and neoliberalism as points of departure, this course will take a critical approach to the study of urban health and its determinants. Beginning with a grounding in urban political economy and governance, the rest of the course will explore several fundamental topics in urban health, including the role of neighborhoods, housing, and spatial processes such as segregation, gentrification, and neighborhood redevelopment on health; social cohesion and social capital; the criminal legal system; climate vulnerability and environmental exposures; and accessibility to health-promoting resources such as healthy food, health care facilities, and more. Given the interdisciplinary nature of urban health, we will draw insights from a range of disciplines (e.g., public health, history, political economy, sociology, critical geography, and urban studies); given the constraints of a single course, the material will primarily focus on the U.S. context. The ultimate goal of this course is to have students develop a critical perspective and a set of actionable frameworks to analyze the relationship between urban processes (political, economic, spatial, etc.) and health.
Equivalent Course(s): HLTH 23900

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): S. Flingai Terms Offered: Autumn Winter
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, 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
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.
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.
Instructor(s): Jason B. Edelstein Terms Offered: Winter
Equivalent Course(s): MSPH 33000

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
Prerequisite(s): STAT 22400/PBHS 32400 or PBHS 32410 or equivalent AND PBHS 34400 or equivalent programming course.

PBHS 34600. Mixed Method Research in Community Settings. 100 Units.
This course is designed to train students in mixed methods research design and evaluation. Mixed methods are the use of quantitative AND qualitative methods to explore health problems, engage communities, and evaluate solutions. It includes an in-depth discussion of the rationales for specific techniques and the role of theory in guiding and informing a health research project. Students will learn design considerations that are best suited for qualitative over quantitative methods (and vice versa) or both methods. Specifically, the course focuses on training, through lecture, group work and hands-on experiences, across five data collection methods commonly used in mixed methods research: survey design and implementation, observation, interview, focus group, and use of existing quantitative data. Students will undertake a pilot research study as a means of practicing their mixed methods approaches and data collection skills. Multiple data analyses techniques (e.g., content analysis, narrative analysis, multivariable model construction, qual-quant triangulation) will be conceptually explained. Students will leave the course with practical skills to conduct research through public health practice.
Instructor(s): David Moskowitz Terms Offered: Winter
Equivalent Course(s): PBHS 24600

PBHS 34700. Community Health Promotion. 100 Units.
A person's health depends not only their genes or behavior, but also where they live, learn, work, play, and age. This course examines how social and community structures and policies influence health and can produce health disparities. Structural issues (e.g., economic stability, housing, food security, health care access and quality, broadband access, health and digital literacy, violence, discrimination) are key social determinants of health. This course will describe and apply: 1) frameworks for understanding health determinants acting at multiple levels, and 2) community and structural intervention approaches to promote health. Students will learn how to prioritize among health determinants and select among intervention approaches to solve public health problems and improve public health practice.
Instructor(s): J. Tiro Terms Offered: Winter
Note(s): PBHS 34100 Recommended
Equivalent Course(s): PBHS 24700

PBHS 34800. Management of Community Health Organizations. 100 Units.
This course encompasses an in-depth exploration of the healthcare environment and its associated organizational implications. It provides students with a comprehensive framework for understanding and effectively managing health services and healthcare sector organizations. The curriculum further delves into the application of managerial leadership skills, highlighting their influence on both individuals and institutions within the dynamic healthcare sector. Additionally, it addresses the intricacies of resource management within a framework that considers principles, personnel, processes, and organizational design. Strategic and organizational management,

management tools for performance improvement, and the various roles and functions in healthcare management are covered in detail. Furthermore, the course explores organizational behavior perspectives and theories that serve as the foundation for critically examining management in healthcare. It emphasizes the interpersonal skills and knowledge necessary for managers in this ever-evolving field, allowing students to develop a holistic approach to understanding the complexity of health sector organizations. The curriculum underscores the importance of applying current theories to practical situations, covering areas such as management, employee motivation, group dynamics, team development, power dynamics, conflict resolution, and negotiation skills.
Instructor(s): TBN Terms Offered: Spring

PBHS 34900. GIS and Spatial Analysis for Public Health. 100 Units.
This course serves as an introduction to the core concepts and tools for applying spatial analytic methods to public health questions. Using a combination of lectures, case studies, and hands-on in-class trainings, students will learn fundamental spatial concepts, as well as how to make sense of and prepare spatial health data for mapping and statistical analyses (including georeferencing, geocoding, merging data sources, and describing and analyzing spatial health patterns and relationships). Throughout the course, we will draw from writings and examples in public health, urban planning, sociology, and critical geography studies to gain an understanding not only of the use of mapping in understanding the spatial nature of health and disease, but also the power dynamics of map-making as a practice. By the end of the course, students will become familiar with a breadth of foundational concepts, technical skills, and critical perspectives to produce and interpret maps and spatial health analyses at an introductory level.
Instructor(s): S. Flingai Terms Offered: Autumn
Equivalent Course(s): HLTH 24900

PBHS 35700. Proseminar on Corporate Power and Capital in the U.S. Health System. 100 Units.
This course examines the US health system through interdisciplinary perspectives, focusing on the interplay between corporate power, capital, and health. Topics include the emergence of modern corporations, the privatization of health services, the commodification of health products, the monetization of health data, and the consolidation of health care markets. The course also explores key tensions in contemporary health systems, including the balance between innovation and affordability, profit motives and equitable access, and corporate interests and public health priorities. Readings draw from economic sociology, political science, health economics, public health, and the history of economic thought. This course aims to offer fresh perspectives to students interested in public health, medicine, health care management, and policy.
Equivalent Course(s): HLTH 35700, HLTH 25700, SSAD 45750

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): E. Cliff Terms Offered: Winter
Prerequisite(s): Microeconomics course recommended
Note(s): Consent of instructor for undergrads.
Equivalent Course(s): HLTH 28010, PPHA 38290

PBHS 38120. Decision Modeling for Health Economic Evaluation. 100 Units.
This course introduces decision science and economic evaluation that has been increasingly used to inform public health and health care decisions. With a specific focus on the development and application of decision-analytic models, students will learn the state of the current practice of economic evaluation, new tools and methodologies to conduct decision modeling, and emerging areas of research, including the value of information analysis. The course will provide hands-on computer-based learning using the R programming language for data analysis and modeling. A prior experience in R is welcomed, but not required. Applying the concepts and techniques learned in the course, students will undertake a course project of their choice to conduct economic evaluation using decision-analytic models. By the end of this course, students will gain knowledge and practical skills in economic evaluation and decision modeling to help make informed decisions.
Instructor(s): David Kim Terms Offered: Winter
Equivalent Course(s): CCTS 42006, PPHA 42006, PBPL 22006, CCTS 22006

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

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. Public Health in Practice. 100 Units.
This is a practicum experience that 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): Moskowitz Terms Offered: Summer
Note(s): For MPH students only.

PBHS 39210. PBHS MPH Reading/Research. 300.00 Units.
Independent research/study for MPH students. Details to be arranged and approved by instructor.
Terms Offered: Autumn Spring Summer Winter
Note(s): PBHS MPH Students Only

PBHS 39300. MPH Capstone Writing and Presentation. 100 Units.
The capstone is a culminating experience designed to provide students with the opportunity to demonstrate mastery of knowledge and skills they have acquired through their Masters in Public Health (MPH) education. Students will work with an advisor on real-time public health issues appropriately applying theory, methods and tools learned in the MPH program. There will also be dedicated class time to explore topics such as NIH grants and grant writing, publishing in peer-reviewed journals, community partnerships, and other areas germane to public health practice. Independent of MPH concentration, this course provides students with an opportunity to work on a research or practice-based project intended to address a public health problem. Students are expected to synthesize and apply what they have learned in their public health coursework as well as develop skills specifically needed for the capstone project and taught through the capstone course. Some portion of the capstone project may entail either development or evaluation of a health program/intervention designed to address a specific public health problem in a particular community, the development and implementation of a community health assessment or other primary data collection effort, or a secondary data/policy analysis to address a specific public health problem. A (1) final report and (2) presentation prepared by the student is the culminating product for the capstone.
Instructor(s): David Moskowitz Terms Offered: Autumn Spring Winter

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. 50 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: Spring
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): G. Hong Terms Offered: Winter
Prerequisite(s): Intermediate Statistics or equivalent such as STAT 224, PBHS 324, PBPL 31301, BUS 41100, or SOCI 30005
Note(s): CHDV Distribution: M; M
Equivalent Course(s): STAT 31900, SOCI 30315, PLSC 30102, MACS 51000, CHDV 30102, CHDV 20102, MACS 21000

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