Epidemiology

Overview
The Department of Epidemiology faculty researches the genetic and environmental factors affecting the distribution of health and illness in large human populations. This serves as a cornerstone of the graduate program and the medical research program by utilizing highly evidence-based biostatistical methodologies to determine the risk factors leading to disease and optimal treatment approaches for clinical practice and medical interventions essential to preventative medicine and public health. In addition to the medical sciences, the epidemiology faculty has diverse research interests and relies on a number of other basic science disciplines including biological sciences (to understand the disease process), biostatistics (to evaluate large population data and develop research methods), geographic information science (to map disease patterns), and social science (to understand proximate and distal risk factors). The Department maintains facilities for research that include genetic, molecular, and biochemical techniques. The faculty in the Department of Epidemiology has strong, peer-reviewed research portfolios and resources needed to support the Department’s postdoctoral and doctoral training programs.

The Department offers a program of study leading to the M.S. and Ph.D. degrees, but not an undergraduate degree. The Department offers undergraduates the opportunity to gain research experience in epidemiology through the Department’s 199 undergraduate research course in epidemiology. This course is available to all upper-division undergraduates irrespective of the individual major they have declared on campus.

Master of Science in Epidemiology
The M.S. degree in Epidemiology requires the student to complete at least four didactic graduate courses (16 units) offered by the department, and elective course work with an additional 8 units of graduate or upper-division undergraduate course work. In addition, the student will typically take additional seminar courses during the graduate study. The student engages in thesis research with a faculty thesis advisor, and will prepare and submit a dissertation to the thesis committee. The final examination is an oral presentation of the thesis to the committee. The normative time to degree is two years for the thesis M.S. degree.

Doctor of Philosophy in Epidemiology
At the end of the first year, students must demonstrate proficiency by passing a preliminary qualifying exam. The purpose of this exam is to verify that the student has completed the required courses of the first-year of the program. The goals of these first-year courses are to establish a foundation of knowledge in the relevant disciplines, to acquire an understanding of research methods including the responsible conduct of research, and to sharpen critical thinking abilities so that students are ready to begin thesis research in which they will take major responsibility for the design, conduct, and publication of Ph.D.- level research projects.

Students must have selected a thesis advisor and joined the advisor’s research group by the end of the third quarter of the first year.

Advancement to Candidacy. Following successful completion of the second year of graduate study, the next step in progression toward the doctoral degree is Advancement to Candidacy. The purpose of this process is to ensure that the student has selected an appropriate topic for the dissertation and that the experimental work that has been completed or is contemplated is scientifically rigorous and likely to be completed successfully and within the normal period of graduate study. The advancement to candidacy exam must be taken by the end of the spring quarter of the third year of graduate study.

Once this examination is completed, the student is advanced to candidacy for the doctoral degree and is expected to complete the degree within two to three years. The student must submit a dissertation on this research and defend the thesis in an oral examination during the final year of graduate study. The normative time for completion of the Ph.D. is five years, and the maximum time permitted is seven years.

Students who are interested in these graduate degrees in Epidemiology should apply to the Department of Epidemiology in the School of Medicine. Applications are available at http://www.grad.uci.edu . For further questions contact EpiGrad@uci.edu or call (949) 824-7401.

The Department of Epidemiology in the School of Medicine also has a joint doctoral program with the School of Social Ecology leading to a Ph.D. in Social Ecology with a concentration in Epidemiology and Public Health. That program is designed to prepare students to conduct research on questions in epidemiology and public health and on related questions on the formulation of environment and health policy. Students interested in that program should contact the School of Social Ecology for information.

Faculty
Hoda Anton-Culver: Chronic disease epidemiology, genetic epidemiology, and cancer epidemiology; genetics information and resources, especially Cancer Registry programs internationally; community-based epidemiology research

Dean B. Baker: Environmental and occupational epidemiology; occupational medicine; toxicology; children’s health; developmental toxicity; exposure, study design; occupational stress; asthma; pesticides; hazardous waste; environmental science; biological markers

Scott M. Bartell: Environmental and occupational epidemiology; probabilistic models and statistical methods, exposure assessment, risk assessment, and decision analysis

B. Dwight Culver (Emeritus): Environmental epidemiology; environmental exposure to chemical and physical agents

Ralph J. Delfino: Environmental epidemiology; effects of community air pollutants on respiratory health and disease, especially asthma and cardiovascular disease

Rufus D. Edwards: Environmental epidemiology; health effects of air pollution, particles, VOC, developing world changes, greenhouse gas, European cities, Expolis project

Chad P. Garner: Biostatistics; theoretical and statistical methods for studying genetic and environmental determinants of common, complex human traits

Daniel L. Gillen: Biostatistics; survival analysis, longitudinal data analysis, clinical trials, sequential testing, and epidemiologic methods
Deborah L. Goodman-Gruen: Cancer and genetic epidemiology, chronic disease prevention, gynecologic oncology, endogenous sex hormones and cardiovascular diseases, replacement therapies

Christine E. McLaren: Biostatistics; analysis of hereditary hemochromatosis

David S. Timberlake: Genetic epidemiology; genetic basis for the use and misuse of licit and illicit substances and the study of genetic predisposition to behavioral disorders, such as antisocial personality disorder

Pathik D. Wadhwa: Behavioral perinatology; biobehavioral processes; stress; pregnancy; fetal development; prematurity; fetal programming of health and disease; psychoneuroendocrinology; psychoneuroimmunology

Nathan D. Wong: Chronic disease epidemiology, coronary calcium, metabolic syndrome, cardiovascular diseases and health prevention

Jun Wu: Environmental epidemiology: air pollution exposure assessment and air pollution epidemiology, maternal, perinatal and infant health

Jason A. Zell: Cancer epidemiology and prevention; focus on gastrointestinal cancers (colon, rectum, and pancreas)

Argyros Ziogas: Biostatistics; development of statistical methodology of doing family studies related to genetic (family-based) data, ascertainment bias, and gene-environment and gene-gene interactions related to cancer etiology

### Courses

**EPIDEM 199. Undergraduate Research in Epidemiology. 2-4 Units.**
Provides disciplinary research participation. Original or existing research options provide undergraduates the opportunity for faculty/mentor interactions including access to appropriate facilities. Medical Epidemiology research areas: Cancer, Genetic/Molecular, Environmental, Occupational, Biostatistics, and Infectious Disease.

Repeatability: Unlimited as topics vary.

Restriction: Upper-division students only.

**EPIDEM 200. Principles of Epidemiology. 4 Units.**
Fundamental principles of epidemiology, biostatistics, and epidemiological research. Topics include research methods of measuring health problems in populations, disease control and prevention in populations, how epidemiology contributes to knowledge of disease etiology, and biostatistical analysis and interpretation of epidemiologic data.

Restriction: Graduate students only.

**EPIDEM 202. Genetic Epidemiology. 4 Units.**
Concentrates on the role of genetic factors in the etiology of disease in human populations with an objective of disease control and prevention and the role of interactions of genetic factors and environmental exposures in the occurrence of disease.

Prerequisite: PUBHLTH 203 or EPIDEM 203 or PUBHLTH 206.

Restriction: Graduate students only.

**EPIDEM 203. Epidemiology. 4 Units.**
Presents descriptive and experimental approaches to the recognition of the causal association of disease in the general population, as these approaches apply to populations using different student designs and models free from the literature.

Same as PUBHLTH 203.

Restriction: Graduate students only.

**EPIDEM 204. Biostatistics. 4 Units.**
Designed to help students develop an appreciation for statistician’s view of the research process, emphasizing biomedical research. Instills an understanding of how statistical models are used to yield insights about data that form evidence-based understanding of the world around us.

Same as PUBHLTH 204.

Restriction: Graduate students only.

**EPIDEM 205. Environmental Epidemiology. 4 Units.**
Concentrates on epidemiological approaches to the assessment of community environmental hazards; issues involved in environmental exposure estimation; interdisciplinary approaches to environmental epidemiology, including the use of biomarkers of exposures and susceptibility; epidemiological studies within the context of risk assessment.

Prerequisite: EPIDEM 200 and EPIDEM 204.

Restriction: Graduate students only.

**EPIDEM 205. Environmental Epidemiology. 4 Units.**
Provides students with knowledge of the basic principles, concepts, and methods used in statistical genetic research. Topics include principles of population genetics, and statistical methods for family- and population-based studies.

Prerequisite: Two quarters of upper-division or graduate training in statistical methods.

Same as STATS 257.

**EPIDEM 215. Introduction to Statistical Genetics. 4 Units.**
Advanced topics in the design and statistical analysis of epidemiologic studies. Topics include simulation methods, counter-matching and multistage study designs, missing data, and Bayesian analysis. Published simulation studies are discussed and replicated using the R software package.

Prerequisite: PUBHLTH 101B or STATS 111 or STATS 211.

Same as PUBHLTH 205.

Concurrent with PUBHLTH 119.

**EPIDEM 232. Chronic Disease Epidemiology & Prevention. 4 Units.**
Epidemiological aspects of chronic human diseases. Topics include methodologies for quantifying aspects of prevalent chronic diseases including risk factors, identification of susceptible groups, societal burdens, promising future research; and the intervention, prevention, and control of diseases in populations.

Restriction: Graduate students only.
EPIDEM 244. Toxic Chemicals in Environment. 4 Units.
Industrial ecology of toxicants and their impacts on environmental quality and human health. Explores theoretical basis of toxicity thresholds and regulatory issues. Uses classic and contemporary research articles to understand the legacy of traditional toxicants, and to identify emerging threats.

Same as PUBHLTH 276.
Restriction: Graduate students only.

EPIDEM 264. Introduction to Environmental Health Science. 4 Units.
Convergence of agents (chemical, physical, biological or psychosocial) in environment can emerge as diseases influenced by social, political, and economic factors allowing them to become rooted in society. How these agents from various spheres come together and impact human health.

Same as PUBHLTH 264, TOX 264.
Restriction: Graduate students only.

EPIDEM 265. Advanced Environmental Health Science. 4 Units.
Explores the complex relationships among exposure processes and adverse health effects of environmental toxins focusing on specific chemicals, sources, transport media, exposure pathways, and human behaviors. Techniques of environmental sampling for exposure assessment are discussed.

Same as PUBHLTH 265.
Restriction: Graduate students only.

EPIDEM 269. Air Pollution, Climate, and Health. 4 Units.
Emission of air pollutants into the atmosphere, physical and meteorological processes that affect transport, and influence on global warming. Concepts of how and where people are most exposed, and how exposures and health effects differ in developed and developing regions.

Same as TOX 269, PUBHLTH 269.

EPIDEM 270. Human Exposure to Environmental Contaminants. 4 Units.
Introduces founders of conceptual thought that environmental contaminants can impact health. Theory and principles of exposure assessment, the continuum from emissions of a containment into the environment to evidence of health effects in a population.

Same as TOX 270, PUBHLTH 270.

EPIDEM 275. Special Topics in Epidemiology. 1-4 Units.
Presents various topics and latest research in the broad field of epidemiology.

Repeatability: Unlimited as topics vary.
Restriction: Graduate students only.

EPIDEM 290. Introduction to Biostatistics and Epidemiology for Medical Fellows. 4 Units.
Prepares medical fellows and other physicians for rotations in research programs. Understanding of basic biostatistics and study design, and interdependencies between the two. Application of principles in evaluation of medical literature for guidance on patient care and public health policy.

Prerequisite: Medical degree.