Epidemiology

See Medicine and Epidemiology (VME), on page 339.

Epidemiology (A Graduate Group)

David R. Gibson, Ph.D., Chairperson of the Group

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Faculty

Sharif Aly, D.V.M., M.P.V.M., Ph.D., Assistant Professor (Population Health and Reproduction)
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Rahman Azari, Ph.D., Lecturer (Statistics)
Heejung Bang, Ph.D., Associate Professor (Public Health Sciences)
Christopher M. Barker, Ph.D. (Center for Vectorborne Diseases)
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Kenneth Brown, M.D., Professor (Nutrition)
Diana Cassady, D.P.H., Associate Professor (Department of Public Health Sciences)
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Rosemary Cress, Ph.D., Associate Professor (Public Health Sciences)
Beate Crossley, Ph.D., Associate Professor (California Animal Health and Food Safety Laboratory)
Kathryn DeRiemer, Ph.D., Associate Professor (Public Health Sciences)
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Kathryn Dewey, Ph.D., Professor (Nutrition)
Christiana Drake, Ph.D., Professor (Statistics)
Jonathan Ducore, M.D., Ph.D., Professor (Pediatrics)
Holly Ernest, D.V.M., Ph.D., Professor (Population Health & Reproduction)
Thomas B. Farver, Ph.D., Professor (Population Health and Reproduction)
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Sunny Kim, Ph.D., Associate Professor (Public Health Sciences)
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Christine Kreuder-Johnson, Ph.D. Associate Professor (Wildlife Health Center)
Michaele A. La Merrill, MPH, Ph.D., Assistant Professor (Environmental Toxicology)
Paul Leigh, Ph.D., Professor (Department of Public Health Sciences)
Chin-Shang Li, Ph.D., Professor (Department of Public Health Sciences)
James Marcin, M.D., M.P.H., Professor (Pediatrics)
Beatriz Martinez Lopez, D.V.M., M.P.V.M., Ph.D., Assistant Professor (Medicine and Epidemiology)
Jonna Mazzel, Professor, Ph.D. (Wildlife Health Center)
Stephen McCurdy, M.D., Professor (Department of Public Health Sciences)
Joy Melnikow, M.D., M.P.H., Professor (Family and Community Medicine)
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William Reisen, Ph.D., Professor (Vectorborne Disease)
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Robert Szabo, M.D., Professor (Orthopedic Surgery)

Daniel Tancredi, Ph.D., Assistant Professor (Pediatrics)
Xiaowei Wang, Ph.D., Assistant Professor (Department of Public Health Sciences)
Michael Ziccardi, Ph.D. (Wildlife Health Center)

Emeriti Faculty

Robert Bondurant, D.V.M., Professor Emeritus
James Case, D.V.M., Ph.D., Professor Emeritus
Nancy East, M.P.V.M., D.V.M., Professor Emeritus
Bruce Elderidge, Ph.D., Professor Emeritus
Neil Flynn, M.D., M.P.H., Professor Emeritus
Sharon Hietala, Ph.D., Professor Emeritus
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John Robbins, M.D., M.H.S., Professor Emeritus
Robert Shumway, Ph.D., Professor Emeritus
Mark Thurmond, D.V.M., M.P.V.M., Ph.D., Professor Emeritus
Alvin Wiggins, Ph.D., Professor Emeritus

Graduate Study. The Graduate Group in Epidemiology offers programs of study and research leading to the M.S. and Ph.D. degrees. Areas of emphasis include environmental/occupational epidemiology; infectious disease epidemiology; zoonotic and vector-borne diseases; epidemiologic methods and biostatistics; health services and health economics; nutritional epidemiology; reproductive, perinatal, developmental and pediatric epidemiology; wildlife epidemiology; and social and behavioral epidemiology. For detailed information regarding the program, address the chairperson of the group or see the website.

Graduate Advisers. Janet Foley (Medicine and Epidemiology), Lihong Qi (Public Health Sciences), and William Reisen (Center for Vectorborne Diseases)

Required Courses for the Program

Pre-Requisite Courses. Prerequisites may be taken concurrently with required courses below.
Mathematics 16A-16B or 21A-21B
Statistics 102, 106, and 108, or Preventive Veterinary Medicine 402, 403

Required Courses. These courses are required of all students in the program; M.S. and Ph.D. degrees. These requirements cannot be waived and must be met before a student's Qualifying Examination.

Epidemiology 202, 203, 204, 205, 206, 207, 208 and 290
One course from: Population Health and Reproduction 202 or Statistics 244

Related Courses. For additional course work in Epidemiology, please see Medicine and Epidemiology, Preventive Veterinary Medicine, Population Health and Reproduction, Public Health Sciences, and Statistics.

Courses in Epidemiology (EPI)

Graduate

202. Quantitative Epidemiology I: Probability (5)
Lecture—4 hours, laboratory—2 hours. Prerequisite: Mathematics 16A/B or 17A/B or 21A/B or equivalent, Statistics 102 and 108 or Population Health and Reproduction 402 or 403 or equivalent; concurrent or previous enrollment in a basic epidemiology course (e.g., course 205). Foundations in probability for epidemiologists. Emphasis on properties of and relationships between distributions and application of probability concepts to epidemiology. Includes a mathematical skills laboratory to assist in solution of epidemiologic problems.

203. Quantitative Epidemiology II: Statistical Inference (4)
Lecture—3 hours, laboratory/discussion—1 hour. Prerequisite: course 202, or Statistics 130A, or 131A, or 133; basic course in Epidemiology (205 or equivalent). Provides the mathematical statistics foundation for statistical models, methods, and data analysis.
204. Quantitative Epidemiology III: Statistical Models (4)
Lecture—2 hours; laboratory/discussion—1 hour. Prerequisite: course 203, or Statistics 130B, or Statistics 131A, or Statistics 132, course 228 recommended. Provides the mathematical foundation for statistical models, methods, and data analysis in the areas of generalized linear models and survival analysis methodology.

204A. Foundation of Statistical Models, Methods, and Data Analysis for Scientists (4)
Lecture—3 hours; laboratory/discussion—1 hour. Prerequisite: Statistics 130A, or Statistics 131A, or Statistics 133, course 228 recommended. Provides the mathematical foundation for statistical models, methods, and data analysis. —II. (II) Bang

204B. Statistical Models, Methods, and Data Analysis for Scientists (4)
Lecture—3 hours; laboratory/discussion—1 hour. Prerequisite: course 204A; Statistics 108 recommended. Introduces statistical models, methods, and data analysis in the areas of generalized linear model and survival analysis methodology.

222. Epidemiological Modeling (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: Preventive Veterinary Medicine 405. Techniques of model building and simulation of infectious diseases will be introduced and modeling philosophy, construction and validation will be emphasized. Offered in alternate years.—II.

223. Spatial Epidemiology (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: Preventive Veterinary Medicine 405 or Environmental Studies 126 or Veterinary Medicine 409. Geographic Information Systems (GIS) and spatial statistics. Students are expected to complete a term project based on their graduate research. Offered in alternate years.—II.

224. Health and Ecological Risk Analysis (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: Preventive Veterinary Medicine 406 or consent of instructor; background in statistics, including multi-variable techniques; a course in differential equations. A methodological approach to risk analysis for human and animal-related health and ecological issues. Basic principles of risk analysis, including perception, communication, assessment and management. Emphasis on the assessment of risk.—II.

225. Advanced Topics in Epidemiology Methods (2)
Discussion—2 hours. Prerequisite: courses 205B, 206, and 207 (or equivalents), with consent of instructor. An in-depth study of topics in epidemiology theory and methods, selected from: causal inference, confounding, study design, or other related areas, with year to year variation. Readings are assigned and students are expected to lead discussions on them. May be repeated for credit when topic differs. Offered irregularly.—III. Hertz-Picciotto

226. Methods for Longitudinal and Repeated Measurement Data (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: course 204 or consent of instructor. Mixed models for longitudinal data (LD)/repeated measurements; Mean and covariance models; General linear LD models; Random coefficients models; Linear mixed effects models for continuous outcome; Generalized linear mixed effects model for discrete outcome including binary, ordinal and count data.—I. (I) Gold

229. Geographic Information Systems for Health Professionals (4)
Lecture—2 hours; laboratory—6 hours. Emphasis on basic geographic and data management principles. Focus on software and its application to analyzing/solving health-related problems. For graduate and professional students in epidemiology, public health, preventive veterinary medicine, health informatics with interest in spatial techniques in research.—III. (III) Beckett

230. Problems in Epidemiologic Study Design (4)
Lecture—3 hours; term paper. Prerequisite: Preventive Veterinary Medicine 405 and 406 or the equivalent, Population Health and Reproduction 207 concurrently; Statistics 102 and 106 or the equivalent. Design and development of research protocols and funding applications for peer review. Application of research methods data collection and management and statistical analysis in research proposals. Methods of evaluating research proposals, mechanisms of funding, specifying human subjects considerations in the proposal.—I. (I) Beckett

251. Environmental Epidemiology (3)
Lecture—3 hours. Prerequisite: Preventive Veterinary Medicine 405 (may be taken concurrently); upper division undergraduates who have completed Environmental Studies 126, or the equivalent. Examination of the human health effects and the risk of disease from community, occupational, and personal exposure to toxic substances. Offered in alternate years.—II. Schenker

252. Social Epidemiology (2)
Lecture/discussion—2 hours. Prerequisite: course 205A; consent of instructor. Social determinants of health; psychosocial and physiological pathways; health and social inequality; gender and race/ethnic disparities in health; social support, social cohesion and health; social gradient in behavioral risk factors; social ecological approaches to health intervention; interventions addressing social determinants. (Same Course as Public Health Sciences 252.)—III.

260. Epidemiology of Chronic Diseases and Aging (3)
Lecture/discussion—3 hours. Overview of the epidemiology of chronic disease in old age. Topics include biology of aging, epidemiology of cardiovascular disease, neoplasms, osteoporosis and fractures, psychosocial factors and health in old age, dementia, functional status and prevention of disease.—II.

270. Research Methods in Occupational Epidemiology (3)
Lecture/discussion—3 hours. Prerequisite: Environmental Studies 126 or Preventive Veterinary Medicine 405; and Statistics 102 or Epidemiology and Preventive Medicine 402. Methods in epidemiologic research on occupational hazards. Topics include design and analysis of cohort and case-control studies, sample size, measuring dose, choosing a control group, validation of employment and health data, interpreting negative studies, and analyzing software. Offered in alternate years.—III.

272. Cancer Epidemiology (2)
Recitation—1 hour; discussion—1 hour. Prerequisite: must have basic understanding of epidemiologic and statistical concepts that are covered in courses 205A, 205B, 206, and 207 (may be taken concurrently), and Statistics 102. We will cover the underlying concepts essential to understanding cancer epidemiology, such as trends in incidence and survival, epidemiologic methods used to assess cancer etiology, prevention and control, and an introduction to the canceriniatration and progression multi-stage model.—II. (II) Cress

290. Seminars in Epidemiology (1)
Seminar—1 hour. Students will actively participate in presentation and discussion of ongoing or published research projects in epidemiology. (S/U grading only).—I, II, III.

291. Seminars in Human Health Services Research and Clinical Epidemiology (1)
Seminar—1 hour. Critical review, evaluation, and discussion of research in health services and clinical epidemiology. Presentation of statistical, epidemiologic, and econometric methods. Students present their own research and critique the work of others. May be repeated for credit. [Same course as General Medicine 291.] (S/U grading only).—I, II, III.

298. Group Study (1-5)
Seminar—1.5 hours. Group study in selected areas of epidemiology.

299. Research (1-12)
Research in selected areas of epidemiology. (S/U grading only).

Review of basics of clinical study design and analysis of clinical data. (S/U grading only).—I. (I) McCurdy, Romano