

EPIDEMIOLOGY

Degrees offered:

M.P.H.	52	M.S.	53
M.P.H., Global Health Track . . .	53	Dr.P.H.	54
		Ph.D.	54

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Overview

Epidemiology is considered the cornerstone of public health. Epidemiologists study the distribution and causes of disease in human populations; they also develop and test ways to prevent and control disease. Epidemiology is critical to disease prevention because it sheds light on why a particular disease originates, how it spreads, and its effective control. It encompasses infectious diseases as well as chronic diseases. The discipline of epidemiology has a conceptual theory, a specific methodology, and a body of substantive knowledge. An academic background in health, the biological or social sciences, or in mathematics and statistics is desirable for candidates wishing to enter this field. Demonstration of quantitative skills is required for admission. Admission is for fall term only.

The large faculty works in a collaborative environment in diverse areas such as infectious disease, chronic disease, social epidemiology, neurodevelopmental epidemiology, molecular epidemiology, psychiatric epidemiology, and genetics, with a move to more global work. The department teaches and practices epidemiology with an eye toward active engagement in public health; while there is a focus on the basic methods and philosophy of the discipline, we also emphasize the practical public health benefit. This is evident in all of the major research programs, as illustrated by the following:

1. The benchmark public health event of our times is the HIV pandemic, and specifically, the devastation it has wrought on sub-Saharan Africa. The department is the home of a major

effort to respond to this public health crisis, including prevention and treatment in the context of developing countries, the use of antiretroviral regimes, the development of vaccines and other prevention strategies, the promotion of modified breast-feeding practices, and the study of various modes of transmission.

2. The most dramatic local (i.e., NYC) public health event in recent times was the terrorist attack of September 11, 2001. The department has taken a leading role in documenting the massive impact of this event on the mental health of New Yorkers and in helping the city to develop treatment models and standards for preparedness, including mental health services.
3. Emerging infections such as HIV, West Nile, and SARS have become a threat to global health. Scientists with expertise in molecular and genetic epidemiology are essential for dealing with these new diseases. The department's faculty plays a central role in the identification and control of new pathogens (including preparedness for bioterrorism).
4. The Injury Prevention Program at Harlem Hospital (part of the Injury Free Coalition for Kids and supported by the Robert Wood Johnson Foundation) is a model of how a successful local program has become a nationwide example for child injury prevention. It is also an example of how our department, Harlem Hospital, Columbia University, and the state and city departments of health worked together along with a wide range of neighborhood groups to create significant change.
5. The Department of Epidemiology has numerous ties to the Department of Health of New York City, working together on the aftermath of the WTC disaster, bioterrorism and preparedness, mental health, HIV/AIDS and public health, antismoking initiatives, and long-standing programs, such as the above-mentioned Injury Prevention Program.

Academic Programs

MASTER OF PUBLIC HEALTH (M.P.H.)

This concentration emphasizes the basic epidemiologic concepts and skills essential for research, program planning, and evaluation. These include (1) a conception of health and disease as determined by the interactions of biological, environmental, and societal variables; (2) the design of epidemiologic studies, including field surveys, and the collection, analysis, and interpretation of large amounts of data; and (3) an understanding of the epidemiologic principles and methods that serve as the foundation for rational strategies of public health intervention. The program aims to prepare students for careers in public health with a focus on research and community diagnosis, public health action, and program evaluation.

Courses in epidemiology cover methodological, biomedical, and sociomedical areas. The selection of specific courses depends on each student's background and major areas of interest. In addition to a general orientation to the principles of epidemiology and the

design and application of epidemiologic studies, students may focus on epidemiologic approaches to one of several special areas of public health concern, such as chronic diseases, child health and development, psychiatric problems, or evaluation of programs and services. Other courses focus on methods in epidemiology, including study design, measurement, and statistical issues. Four semesters of full-time coursework are usually required. A master's thesis, usually undertaken in conjunction with the practical experience, is required for the concentration. Students who meet the practicum requirement through prior experience prepare the master's thesis on a subject agreed upon with the advisor.

M.P.H., 45 Points*

Core Course Requirements

Rule: Complete all (see page 20)

Department Requirements

Points

Rule: Complete all

P8100 Applied Regression Analysis	3
P8120 Analysis of Categorical Data	3
P8400 Epidemiology III: Applied Epidemiologic Analysis	3
P8438 Epidemiology II: Design and Conduct of Observational Epidemiology	3
P9419 Master's Thesis in Epidemiology I: Proposal	1
P9420 Master's Thesis in Epidemiology II: Thesis	2
P9480 Research Seminars in Epidemiology	0.5

Track Requirements and Electives

Rule: Complete three

P6438 Introduction to Public Health Genetics	3
P6781 The Use of Large-Scale National Health Care Data Sets	3
P8301 Gene-Environment Interactions in Human Disease	3
P8307 Molecular Epidemiology	3
P8401 The Epidemiological Evaluation of Drug Safety	3
P8403 Nutritional Epidemiology	2
P8404 Epidemiology of Genetics and Aging	3
P8405 Genetics in Epidemiology	3
P8406 Epidemiology of Infectious Diseases I	3
P8410 Reading Seminar in Psychiatric Epidemiology I	3
P8411 Reading Seminar in Psychiatric Epidemiology II	3
P8413 Breast Cancer as a Public Health Issue	3
P8414 Cancer Epidemiology	3
P8417 Selected Problems of Measurement in Epidemiology	3
P8419 Neurobiology and Genetics of Psychiatric Disorders	3
P8421 Intro to Clinical Psychiatry for Epidemiology and Public Health	3
P8422 Perinatal Epidemiology	3
P8432 Environmental Epidemiology	3
P8440 Epidemiology of Cardiovascular Diseases	3
P8442 Epidemiology and Control of Tuberculosis	3
P8457 Epidemiology of Asthma	3

P8465	Epidemiology of HIV and AIDS	3
P8469	Epidemiology of Malaria	3
P8471	Selected Topics in Social Epidemiology in South Africa	2
P8473	Design of Infectious Disease Studies	2
P8475	Topics in Emerging Infectious Diseases	3
P8480	Topics in HIV Prevention Research	3
P8482	Outcomes Research: Methods and Public Health Implications	3
P8483	Applications of Epidemiologic Research Methods	3
P8488	Epidemiologic Research Topics in Developing Countries	3
P8499	Field Methods in Epidemiology	3
P8679	Investigative Methods in Humanitarian Emergencies	3
P8725	Global AIDS Policy	3
P8740	History of Epidemiology	3
P8763	Stigma, Prejudice, and Discrimination as Social Stressors	3
P9407	Methods in Molecular/Genetic Epidemiology	3
P9408	Epidemiology of Infectious Diseases II	3
P9493	Topics in the Epidemiology of Neurological Disorders	3

*This sample curriculum is intended as a guide for program planning. Students develop their curriculum with guidance from their advisor using the department's student handbook at the time they begin their program of study.

Global Health Track in Epidemiology

The Global Health track in the Department of Epidemiology is designed for students who would like to use the basic concepts of epidemiology and apply skills in research design to answer public health questions in low-income countries. Students will complete the core courses, the department requirements for the Master of Public Health in Epidemiology, the Global Health track requirements, and 6 points of coursework in epidemiology with a global health focus. Students must complete the six-month global health practicum and a master's essay in order to fulfill the department and track requirements. (See pages 61–62 for complete track requirements.)

Substantive Global Health Courses in Epidemiology	Points	
<i>Rule: Take two</i>		
P8480	Topics in HIV Research	3
P8475	Topics in Emerging Infectious Diseases	3
P8488	Health Research in Developing Countries	3
P8725	Global AIDS Policy (SMS co-list)	3
P8442	Epidemiology and Control of Tuberculosis	3
P8469	Epidemiology of Malaria	3
P8406	Infectious Disease Epidemiology I	3

MASTER OF SCIENCE (M.S.)

This program enables students to gain a command of the major concepts and techniques of epidemiology, including a grounding in biostatistics. The degree is intended for professionals possessing another terminal graduate-level degree in a related field. Three semesters of part-time academic work and a master's thesis are required.

M.S., 30 Points*

Core Requirements	Points	
<i>Rule: Complete both</i>		
P6103	Introduction to Biostatistics	3
P6400	Principles of Epidemiology	3
Department Requirements		
<i>Rule: Complete all</i>		
P8100	Applied Regression Analysis	3
P8120	Analysis of Categorical Data	3
P8400	Epidemiology III: Applied Epidemiologic Analysis	3
P8438	Epidemiology II: Design and Conduct of Observational Epidemiology	3
P9419	Master's Thesis in Epidemiology I: Proposal	1
P9420	Master's Thesis in Epidemiology II: Thesis	2
P9480	Research Seminars in Epidemiology	0.5
Track Requirements and Electives		
<i>Rule: Complete two</i>		
P6438	Introduction to Public Health Genetics	3
P6781	The Use of Large-Scale National Health Care Data Sets	3
P8301	Gene-Environment Interactions in Human Disease	3
P8307	Molecular Epidemiology	3
P8401	The Epidemiological Evaluation of Drug Safety	3
P8403	Nutritional Epidemiology	2
P8404	Epidemiology of Genetics and Aging	3
P8405	Genetics in Epidemiology	3
P8406	Epidemiology of Infectious Diseases I	3
P8410	Reading Seminar in Psychiatric Epidemiology I	3
P8411	Reading Seminar in Psychiatric Epidemiology II	3
P8413	Breast Cancer as a Public Health Issue	3
P8414	Cancer Epidemiology	3
P8417	Selected Problems of Measurement in Epidemiology	3
P8419	Neurobiology and Genetics of Psychiatric Disorders	3
P8421	Intro to Clinical Psychiatry for Epidemiology and Public Health	3
P8422	Perinatal Epidemiology	3
P8432	Environmental Epidemiology	3
P8440	Epidemiology of Cardiovascular Diseases	3
P8442	Epidemiology and Control of Tuberculosis	3
P8457	Epidemiology of Asthma	3
P8465	Epidemiology of HIV and AIDS	3
P8471	Selected Topics in Social Epidemiology in South Africa	2
P8473	Design of Infectious Disease Studies	2
P8475	Topics in Emerging Infectious Diseases	3
P8480	Topics in HIV Prevention Research	3
P8482	Outcomes Research: Methods and Public Health Implications	3
P8488	Epidemiologic Research Topics in Developing Countries	3

P8499 Field Methods in Epidemiology	3
P8679 Investigative Methods in Humanitarian Emergencies	3
P8725 Global AIDS Policy	3
P8740 History of Epidemiology	3
P8763 Stigma, Prejudice, and Discrimination as Social Stressors	3
P9407 Methods in Molecular/Genetic Epidemiology	3
P9408 Epidemiology of Infectious Diseases II	3
P9493 Topics in Epidemiology of Neurological Disorders	3

*This sample curriculum is intended as a guide for program planning. Students develop their curriculum with guidance from their advisor using the department's student handbook at the time they begin their program of study.

DOCTOR OF PUBLIC HEALTH (DR.P.H.)

The Doctor of Public Health degree program prepares professionals in biomedical and sociomedical fields for advanced careers as epidemiologists. This professional degree is usually suited to candidates with primary training in a related field, such as medicine, nursing, dentistry, anthropology, psychology, sociology, or social work. The Dr.P.H. degree program is targeted toward professionals with an M.D., Ph.D., or other doctoral level degree and an M.P.H., who have had substantial experience working on health-related issues. Applicants should be seeking further doctoral level methodologic training to enhance research in a defined area of substantive expertise. While the required coursework for the Dr.P.H. and Ph.D. degree programs is identical, the qualifying exams and dissertation required for the Dr.P.H. degree are designed to be completed in a shorter period of time.

See the Dr.P.H. section, pages 21–22.

DOCTOR OF PHILOSOPHY (PH.D.)

The goal of the Ph.D. program in epidemiology is to train students for future careers as research epidemiologists in academic, not-for-profit, governmental, and private sector settings. Upon completion of the Ph.D., students are able to identify important public health issues that merit epidemiologic study and conduct independent, scholarly research that advances knowledge about the causes, prevention, and amelioration of human disease. The successful Ph.D. graduate is prepared to teach graduate students and health professionals in academic and other settings and to work collaboratively with health professionals in other disciplines on research and applied projects that include epidemiologic elements.

The Department of Epidemiology at the Mailman School of Public Health has research strengths, faculty, and training in the following areas: cancer epidemiology, cardiovascular epidemiology, environmental epidemiology, genetic epidemiology, infectious disease epidemiology, epidemiologic methodology, neuroepidemiology, perinatal and reproductive epidemiology, psychiatric epidemiology, and social epidemiology. A limited number of fellowships are available in some of these areas.

The Ph.D. program is administered by the Subcommittee on Epidemiology under the auspices of the Graduate School of Arts

and Sciences (GSAS). As such, GSAS rules are followed for tuition payment, residence requirements, and preparation and defense of the dissertation.

Applications for admission to the Ph.D. program are available from GSAS, 108 Low Library, 212-854-6729, and the Department of Epidemiology, 212-305-9412. They are also available on the Web at <http://www.columbia.edu/cu/gsas/download.html>. Completed applications should be submitted to GSAS by January 3. The Doctoral Committee begins to review applications in February for admission the following September.

We look for applicants who are prepared to master the challenging courses and research that make up our doctoral program. All applicants must have a master's degree in epidemiology or a closely related field. At least one semester of calculus and a strong background in the natural and/or social sciences are strongly recommended. We also look for applicants who are committed to public health research and practice. Thus, past research and/or other work experience in public health is encouraged. The statement of purpose, which is part of the application, is very important. We look for students who have a clear understanding of what epidemiology entails and who have well-focused research interests and career goals.

Applicants should inquire in the department about possible sources of financial support that may be available. These sources include training fellowships in some subspecialties (e.g., cancer, infectious disease, genetics, psychiatric disorders), other fellowships (e.g., Kellogg) and scholarships, and research positions. Additional sources of support may become available over the course of the student's academic training. Note, some fellowship and scholarship programs have separate application procedures and deadlines, and make decisions about funding that do not coincide with decisions regarding admission to the Ph.D. program. Applicants should check the requirements in each program of interest and, where possible, speak with the program director and/or coordinator about content, application procedures, and available funding.

Training Programs in Epidemiology

The centers and training programs offer multidisciplinary collaboration of researchers, faculty, students, and policymakers. Training is through didactic courses and research via academic courses, seminar series, and opportunity to participate in ongoing research or independent research projects. Centers or training programs offer funding for pre- and postdoctoral study as well as research opportunity and funding to attend conferences. They are the mainstay of our academic programs in that they validate the quality of our faculty and are a mechanism for drawing excellent students to our programs. The following are some of the training programs in the Department of Epidemiology:

Cancer Epidemiology

The Training Program in Cancer Epidemiology is actually a multidisciplinary program involving faculty and trainees from three departments in the School of Public Health—Epidemiology,

Biostatistics, and Environmental Health Sciences. There are fifteen trainees, half predoctoral and half postdoctoral, all engaged in cancer-related studies and research. Weekly seminars bring all the participants together for presentations by the trainees, and the diversity of the group leads to much cross-fertilization and sharing of ideas. Research projects include studies in the classical and molecular epidemiology of lung cancer, liver cancer, breast cancer, colorectal cancer, and other GI tract cancers. Preventive and behavioral aspects of oncology, chemoprevention, as well as health services research, are also emphasized. Methodology and biostatistics, both in the analysis of observational data and in the conduct of clinical trials, are explored. Internationally renowned experts in nutritional and radiation epidemiology participate, and there are several international cohort and other studies in such locales as Chernobyl, Bangladesh, Taiwan, and the Netherlands. Emphasis is placed on learning clinical and pathologic principles of cancer, as well as gaining an appreciation of advanced biostatistical methods. For more information on this program, go to <http://www.mailman.hs.columbia.edu/epi/research/cancer.html>.

Fellowship in Family Planning Clinical Care and Research

The Family Planning Postdoctoral Fellowship is one of only six fellowships in the nation that focuses on family planning. It is the only fellowship in the nation that provides high-level research and clinical skills in family planning and abortion. The fellowship is designed as a one- or two-year program; the two-year option provides the opportunity to earn a Master of Science degree in public health while working with well-respected and innovative leaders in the field. The fellowship is also designed to develop extensive research and clinical skills, preparing fellows to take the lead in innovative approaches to family planning in the United States and internationally. More information on this fellowship is available at <http://www.cumc.columbia.edu/dept/obgyn/services/family-planning/education.html>.

Genetics of Complex Disorders (GCD) Training Program

The goal of the GCD program is to train postdoctoral (M.D. and Ph.D.) and predoctoral fellows in genetic epidemiology and statistical analysis of psychiatric and other complex diseases. Our mission is to train people who will be aware of all aspects of human genetic studies: study design, clinical aspects, phenotype definition, laboratory issues, and statistical analysis. The field of genetics is changing rapidly, and successful investigators must be competent in a broad array of techniques, must be able to speak the languages of fields outside their own, and must be able to collaborate effectively with scientists in other fields.

Training includes both didactic (coursework and lab rotations) and research components. We seek applicants with training in statistics, epidemiology, and/or genetics and with demonstrated interest in pursuing a career in the genetic analysis of complex disorders. Applicants for postdoctoral positions must have a Ph.D., M.D., or equivalent; predoctoral applicants need a master's degree. The GCD program is affiliated with the

Departments of Biostatistics and Epidemiology at the Mailman School of Public Health and the Department of Psychiatry at Columbia University.

Additional information on this program is available at <http://cpmcnet.columbia.edu/dept/sph/epi/gcd/index.html>.

Infectious Disease Epidemiology Training Program

The Infectious Disease Epidemiology Training Program was established in 2001 with the goal of developing investigators with expertise in the epidemiology of infectious diseases. Funded by the National Institute of Allergy and Infectious Diseases (NIAID), trainees selected for this program are expected to conduct clinical or laboratory-based research with one of the participating faculty mentors. In addition, they are required to obtain a master's or doctoral degree with a focus in infectious disease epidemiology. The goal is that graduates of the program will serve as future leaders in the effort to rapidly identify, prevent, and manage infections in a dramatically changing global environment.

Eligible candidates are expected to pursue a Master of Public Health or doctoral degree as part of this program. For more information, go to <http://www.mailman.hs.columbia.edu/epi/research/Infectious/IDETP-program.html>.

Neuroepidemiology Training Program

The mainstay of the Gertrude H. Sergievsky Center's training efforts has been the postdoctoral fellow education program in neuroepidemiology. This program capitalizes on the strengths of the Department of Neurology, the Departments of Epidemiology and Biostatistics in the Mailman School of Public Health, and the interdisciplinary Gertrude H. Sergievsky Center. It is currently the only NIH-funded neuroepidemiology program. The goal of the program is to prepare neurologists and other research scientists for research careers in the epidemiology of neurologic disorders. Since its inception more than fifteen years ago, the program has trained twenty-four neurologists and neuroscientists who are now professors (two), associate professors (five), assistant professors (eight), or career research scientists at the NIH and elsewhere (nine). Many of the trainees have successfully competed for NIH funding and have established disease-specific neuroepidemiology research programs. The program can only support United States citizens, but the existence of the program has attracted neurologists internationally who have come with their own funding, either from their local government or through the Fogarty Center. Additional information on this program is available at <http://www.mailman.hs.columbia.edu/epi/research/neurodev.html>.

Psychiatric Epidemiology

The Columbia University Psychiatric Epidemiology Training Program was created in 1972 to train individuals from different disciplines in psychiatric epidemiology. It is one of only a small handful of programs designed to provide research training in the epidemiology of mental disorders. The program has trained over 130 researchers, most of whom have gone on to make important

contributions and some of whom have become leaders in the field. The program provides training for seven postdoctoral and five predoctoral fellows. The postdoctoral fellows are a mix of M.D. psychiatrists and Ph.D. social scientists. The precise mix of pre- and postdoctoral fellows varies from year to year, depending on the applicant pool and program needs.

The unifying theme for training involves the use of theory, study design, or measurement innovation to allow previously untested ideas to be tested. In any particular application, one or another of these (theory, design, measurement) might be emphasized, but the mix achieved should always lead to the testing of an idea that increases our understanding of the onset, course, or consequences of mental disorders. Thus, in training fellows, we seek to emphasize that to represent an advance, a research project must test a previously untested idea and that the most likely avenues in which to achieve such tests are theoretical/conceptual advances, well-crafted designs, and innovations in measurement.

To achieve this training goal, fellows complete a series of courses in the Department of Epidemiology at the Mailman School of Public Health and then apply the knowledge from the courses in field placements with research faculty who exemplify how these elements combine and lead to successful tests of important ideas. Continuously throughout this process, trainees develop a breadth of knowledge concerning important work done nationally and internationally through literature, seminars, and attendance at conferences. More information on this program is available at <http://www.mailman.hs.columbia.edu/epi/research/pet.html>.

Course Descriptions

Note: Many courses require permission of the instructor/department as a prerequisite for enrollment. The semester course schedule issued each term (fall, spring, summer) by the Office of Student Affairs identifies courses that require permission prior to registration.

P6400 Principles of epidemiology I, 3 points.

Epidemiology is one of the pillars of public health. Epidemiologists study the distribution and determinants of disease in human populations; they also develop and test ways to prevent and control disease. The discipline covers the full range of disease occurrence, including genetic and environmental causes for both infectious and noninfectious diseases. Increasingly, epidemiologists view causation in the broadest sense, as extending from molecular factors at the one extreme, to social and cultural determinants at the other. This course introduces students to the theory, methods, and body of knowledge of epidemiology. Designed for students in all fields of public health, its primary objective is to teach the basic principles and applications of epidemiology. Part of the core course requirement for the M.P.H.

P6438 Introduction to public health genetics, 3 points.

Reviews the major topics of interest in genetics and public health. Designed to engage students in the critical analysis of the main current contributions of genetics to public health, keeping a focus on gene-environmental interactions as a background of causation and intervention. Covers the following major topics: (1) Role and type of genetic factors that contribute to disease, (2) population prevalence and distribution of morbidity influ-

enced by genetic factors, (3) public health approach to primary, secondary, and tertiary prevention of genetic disorders, (4) concepts, goals, and strategies of genetic services, and (5) ethical, social, and legal issues in public health genetics.

P8400 Epidemiology III: applied epidemiologic analysis, 3 points.

Prerequisites: *P8120* and *P8438*. This course, designed for Epidemiology students, both doctoral and master's, is the third methods course in the series of epidemiologic methods courses. It focuses on analytic methods and epidemiologic design strategies. The class meets each week for a two- or three-hour session. Lectures focus on the theoretical aspects of relevant analytic methods based on Rothman and Greenland's *Modern Epidemiology*. Laboratory sessions meet separately during the week for additional help in performing analyses using the SAS (Statistical Analysis System) programming language. Students are provided with epidemiology data set(s) and are asked to do analyses, to be discussed in class the following week. Restricted to Epidemiology students.

P8401 The epidemiological evaluation of drug safety, 3 points.

Covers the effects of drugs from an epidemiologic perspective. Case-control, cohort, and other observational methods and controlled trials are considered from the perspective of evaluating drug safety and effectiveness. Students are graded on the weekly preparation of critiques of published papers and on the preparation of protocols (to be presented at the end of the course) designed to study topical, real-life issues.

P8403 Nutritional epidemiology, 2 points.

Prerequisite: *P6400*. The use of epidemiology to study the role of nutrition in health and disease with an emphasis on methodological and measurement issues in dealing with nutrition and diet information. Topics covered include selection of data bases for nutrient analysis, dietary assessment instruments and methods, anthropometric and biochemical assessment of nutritional status, design issues in dietary studies, and the relationship of diet to disease using examples from heart disease, cancer, obesity, and osteoporosis literature. Lectures and discussions. A short class presentation and review paper.

P8404 Epidemiology of genetics and aging, 3 points.

Prerequisite: *P8438*. Introduction to research in aging from both the epidemiologic and human genetics perspectives. Methodologic and substantive issues related to aging health profiles are discussed. Topics include study design, modeling of aging, active life expectancy, geriatric conditions, statistical genetics methods, gene mapping of aging phenotypes, human model system, and application to health policy. Required readings, three papers, and one problem set.

P8405 Genetics in epidemiology, 3 points.

Prerequisites: *P8120* and *P8438*, or their equivalents. Methodologic and substantive aspects of genetics in epidemiology, including an introduction to the biological basis of human heredity, complexities in studying the genetics of human disease, and study designs used to disentangle genetic and nongenetic contributions to disease etiology. Topics include methods for collection of valid family history data, familial aggregation studies, gene-environmental interaction, twin studies, segregation analysis, and linkage analysis. Required readings, weekly homework assignments, and two take-home exams.

P8406 Epidemiology of infectious diseases I, 3 points.

Prerequisite: *P6400* or the instructor's permission. Undergraduate-level courses in general microbiology or molecular biology helpful, but not required. Study of the epidemiology of infectious diseases of national and international importance. Methods in outbreak investigation and molecular epidemiology as applied to infectious diseases are emphasized. Course lectures are centered around general topics related to infectious disease epidemiology, with several specific diseases or disease processes exam-

ined in detail as examples for each major mode of transmission. Through exercises, lectures, and readings, students have the opportunity to apply infectious disease epidemiology methods to specific health problems. Lectures are teleconferenced with the NYC Department of Health. Exercises, midterm, and final required.

P8410 Reading seminar in psychiatric epidemiology I, 3 points.

Reading and discussion of selected works on the relationship between sociocultural factors and psychiatric disorders. Emphasis is on public attitudes, selection factors in treatment, and treatment evaluation. Special emphasis is placed on problem formulation. Students learn to generate research problems through a careful consideration of available literature. Lectures and discussion along with symposia to develop and defend a position on a current controversy in psychiatric epidemiology. A short paper (five to fifteen pages) on symposia topic and a take-home exam.

P8411 Reading seminar in psychiatric epidemiology II, 3 points.

Following a brief introduction to basic epidemiological concepts (aimed at those without prior background in epidemiology), this seminar focuses on the epidemiology of selected psychiatric disorders, through the critical reading of research reports dealing predominantly with childhood disorders. The methodological issues and quandaries that arise in psychiatric epidemiology in general, and the developmental issues relevant to the study of children, are foci of discussion.

P8413 Breast cancer as a public health issue, 3 points.

A multidisciplinary overview of the complexity of breast cancer, from the public health perspective. Topics discussed and literature reviewed are drawn from many disciplines including epidemiology, social science, medicine, research, economics, consumer advocacy, law, ethics, health education, government, insurance, and media. Topics address the magnitude of the disease from issues faced jointly by patients, their families, and health care providers. Combines lectures by faculty and guests, and student presentations.

P8414 Cancer epidemiology, 3 points.

Prerequisite: *P6400*. Molecular and cellular biology of cancer and basic mechanisms of carcinogenesis. Role of chemical, viral, radiation, and genetic factors in human cancer. Sources of cancer patient data, with emphasis on acquisition and management of data for clinical and epidemiologic research. Natural history of cancer with analysis of time trends in cancer incidence, mortality, survival, and geographic distribution. Role of environmental factors (ecological/industrial/occupational) in cancer causation. Fundamental issues in cancer screening and applications to public health and medical practice. Lectures and discussions. Assigned readings and term paper.

P8417 Selected problems of measurement in epidemiology, 3 points.

Prerequisites: *P6103* and *P6400*, or their equivalents. Introduction to basic concepts of measurement theory—reliability and validity. Students learn to develop a system of thinking intended to underscore the importance of measurement for causal inference and are able to assess the quality of measurement in epidemiologic research. Special emphasis on the consequences of measurement error for causal inferences.

P8419 Neurobiology and genetics of psychiatric disorders, 3 points.

Taught by faculty in the Departments of Epidemiology and Psychiatry, with a focus on biologic and genetic factors in the development of psychiatric disorders. Provides an overview of the basic theories, concepts, and methods in neuroanatomy, neurochemistry, neuroimaging, and psychiatric genetics. While substantive findings are described, the emphasis is on methodological issues and the role of biological and genetic approaches in psychiatric epidemiology.

P8421 Introduction to clinical psychiatry for epidemiology and public health, 3 points.

For nonclinicians being trained in psychiatric epidemiology to familiarize them with the major psychiatric clinical entities, with DSM-III, and relevant issues concerning diagnosis. Special clinical topics are developed concerning childhood psychopathology and geriatric psychiatry.

P8422 Perinatal epidemiology, 3 points.

Prerequisite: *P6400*. A seminar on the events in the perinatal period both as outcomes of interest and as influences on child development. Topics to be covered include teratogenesis, reproductive loss, low birth weight, preterm delivery, and pre- and perinatal infections. Emphasis on issues of measurement and study design and the weighing of epidemiologic evidence.

P8432 Environmental epidemiology, 3 points.

Prerequisites: *P6103* and *P6400*. A selected research topic in environmental epidemiology is discussed in depth each week, along with pre-assigned readings. Special emphasis is given to study design, exposure assessment, outcome definition, and sources of bias. Discusses ongoing research at the Mailman School of Public Health and emphasizes environmentally induced diseases (including asthma and other respiratory effects, cancer, and neurologic impairment). A paper outlining an original study design on an environmental topic of interest is required. A final comprehensive exam is the other basis for course evaluation.

P8438 Epidemiology II: design and conduct of observational epidemiology, 3 points.

Prerequisites: *P6103* and *P6400*, or their equivalents. Aim is to provide students with the knowledge and skills necessary to design, carry out, and interpret observational epidemiologic studies of diseases. Topics include the development and operationalization of research hypotheses, design issues (cohort, case/control, cross-sectional, ecologic, etc.), basic analytic approaches, sampling, measurement, questionnaire design, and ethical issues in epidemiologic research. Lectures are accompanied by computer lab sessions, required readings, and weekly exercises. Evaluation is based on the exercises and a final exam.

P8440 Epidemiology of cardiovascular diseases, 3 points.

Prerequisite: *P6400* or the equivalent. An overview of current epidemiologic knowledge of cardiovascular disease (CVD), including coronary heart disease, stroke, and hypertension, with the aim of providing familiarity with the scope and magnitude of the CVD problem, a working knowledge of the major and minor risk factors for the various manifestations of CVD, and an appreciation for the methodologic problems encountered in cardiovascular epidemiologic research. Lectures, presentations by invited speakers, and student presentations.

P8442 Epidemiology and control of tuberculosis, 3 points.

Prerequisites: *P6103* and *P6400*. An in-depth look at the epidemiology and control of tuberculosis (TB). Students are lectured by specialists in the field of TB epidemiology, outbreak investigation, drug resistance, hospital-acquired infection, contact tracing, directly observed therapy (DOT), prevention, TB and HIV in the United States and abroad, BCG vaccination, treatment recommendations, as well as the ethical issues of coercion related to DOT and the politics and perspectives for the future. Students are expected to master the field of infectious disease epidemiology as it applies to TB. Course readings cover state-of-the-art and historical articles. Midterm exam and a final paper.

P8457 Epidemiology of asthma, 3 points.

Prerequisites: *P6400* and *P6103*. Introduction to biostatistical methods. Examines the global and local asthma epidemic, the methodologic issues it raises, what is known about various exposures as etiologic factors or as triggers for asthma attacks, and the problems of determining cause and

effect in the setting of a condition that varies by time, place, and person. By the end of the course, students should have an appreciation of (1) the dimensions of the asthma epidemic; (2) how asthma is diagnosed, is treated, and changes over the life course; (3) what risk factors are considered important and the current state of research on these risk factors; and (4) the problems of, and available tools for, studying a life course disease.

P8465 Epidemiology of HIV and AIDS, 3 points.

A state-of-the-art review of the epidemiology of HIV infection and AIDS, with particular emphasis on the development of the epidemic in New York City. Lectures by leading experts in the field focus on the current status of infection in population groups and predictive models of future disease development. Additional topics include ongoing research on screening, surveillance, preventive education, and program evaluation. The student develops the ability to evaluate scientific publications and is prepared to participate actively in AIDS education or research at the applied level. The student is expected to demonstrate a thorough knowledge of HIV and AIDS by participation in class discussion and by exam.

P8469 Epidemiology of malaria, 3 points.

Examines the ecological and epidemiological characteristics of malaria, transmission dynamics, economic costs of malaria, available intervention strategies, and the global challenge of its control. By the end of the course, students should have an appreciation of (1) the extent of the malaria problem on health and socioeconomic development, (2) the diagnosis and treatment of malaria, (3) vector control and other preventive strategies, (4) current state of research on drug development and vaccines, and (5) the challenge of the Global Partnership for mobilizing resources for malaria. Format is a lecture by the instructor and guest lecturers, followed by discussion. Students have to hand in a twenty-five-page paper and a total of three outside-of-class group work assignments.

P8471 Selected topics in social epidemiology in South Africa, 2 points.

There is growing interest in epidemiology in how social and economic conditions affect population health. However, most "social epidemiology" research has focused on Europe and North America, and there is a much smaller literature on how social factors influence health in regions of the global South. This class adopts an epidemiological approach to investigating the social determinants of health, using South Africa as a starting place for more general discussions of (1) how various social, cultural, and economic influences shape distributions of morbidity and mortality in different populations and (2) the public health response to these findings. Special attention to topics particularly relevant to public health in South Africa, such as macroeconomic policy, relation of race to other socioeconomic indicators, and the effects of occupation on health. Focus on conditions that dominate the burden of disease in South Africa and other countries in the region, specifically HIV/AIDS, other sexually transmitted infections, tuberculosis and other lung diseases, and violence. Readings include general concepts such as social epidemiology and life course epidemiology, data-based studies, and discursive papers from South Africa as well as from developed and other developing countries. By the end of the course, participants should be able to demonstrate (a) insight into ways of thinking about and investigating social determinants of population health and changing patterns of disease, and (b) understanding of how these insights have been applied in South Africa and could be applied in similar settings.

P8473 Design of infectious disease studies, 2 points.

Presents the design and conduct of contemporary epidemiologic ID studies. Each week, resident faculty or a guest lecturer presents in detail a research project for a specific infectious disease, emphasizing background, design, findings, and inferences, followed by a class discussion. Students are required to select a research question, develop a written proposal

for a study utilizing the standard NIH form 398 proposal format, and present the proposal in class. Evaluation is based on the written and oral presentation and on class participation.

P8475 Topics in emerging infectious diseases, 3 points.

Prerequisites: *P6400* and some familiarity with molecular biology; *P8406* recommended. Examines the concept of emerging infectious diseases and our current understanding of emergence. Methods of identifying and studying emerging pathogens, factors responsible for disease emergence, and methods of surveillance and intervention are discussed. Examples of pathogens are considered. As problems closely related to the natural examples of emerging infectious diseases, public health aspects of biowarfare and bioterrorism are also discussed. By the end of the course, the student should understand what constitutes an emerging infection, appreciate why and how infections emerge, understand what approaches are currently available to track, predict, and respond to emerging infections, recognize the strengths and limitations of current capabilities for surveillance and control, and be able to identify similarities and differences between natural outbreaks of disease and biowarfare/bioterrorism. Lectures, presentations by invited speakers, and discussions. Midterm and final exam or paper.

P8480 Topics in HIV prevention research, 3 points.

Prerequisites: *P6400*, *P6103*, and *P8406*. Provides a comprehensive historical, immunological, public health, and epidemiological overview of vaccines. Topics address major milestones in the history of vaccines: principles of vaccination, impact of vaccines on disease eradication, the design and interpretation of vaccine trials, posttrial surveillance, and new vaccines in development. Lessons are drawn from experiences with a variety of vaccines including smallpox, polio, measles, pertussis, influenza, rubella, rotavirus, pneumococcus, HIV, hepatitis B, HPV, lassa fever, and BCG. Completion of individual and group assignments as well as an independent literature review on the development of one specific vaccine and its public health impact is required.

P8482 Outcomes research: methods and public health implications, 3 points.

Designed to engage students in the understanding, analysis, and design of outcomes research. Focuses on the methodology of outcomes research and also addresses the public health implications of outcomes research. Includes four major topics: (1) The conceptual paradigms and the empirical evidence that gave rise to the outcomes research movement, (2) risk adjustment for measuring healthcare outcomes, (3) designing and evaluating quantitative subjective outcome measures, and (4) the public health implications of outcomes research.

P8483 Applications of epidemiologic research methods, 3 points.

Prerequisites: *P6400*, *Biostatistics P6103/6104*; students should also take *P8438* concurrently with this course. Allows students to associate epidemiological concepts and techniques with appropriate statistical methods learned in the epidemiology and biostatistics core courses to answer research questions and test hypotheses. Students learn to use principles and methods of epidemiology and classical statistical approaches. Successful completion enables application and interpretation of basic epidemiologic methods. Students are provided with several datasets to answer a given research question and test the hypotheses associated with it. Laboratory session with small discussion groups of journal articles relevant to the epidemiologic studies design covered during the core epidemiology and epidemiology II courses.

P8488 Epidemiologic research topics in developing countries, 3 points.

Prerequisite: *P6400*. An introduction to the methodological, practical, and ethical considerations in the conduct of health research, specifically epidemiological studies, in developing countries. Designed for students who have already completed *P6400 Principles of epidemiology* and who

have a familiarity with basic epidemiological methods. Each session examines a different study design with a facilitator experienced in implementing this type of study in a developing country. Facilitators' presentations and class discussions emphasize the practical aspects of planning and implementing studies in developing countries, including institutional relationships, ethical considerations, and relevance to public health policy and practice.

P8499 Field methods in epidemiology, 3 points.

Prerequisite: *P8438; P8115 Sample survey theory* recommended.

A major objective of this course is to prepare researchers to conduct epidemiological field studies that yield valid and reliable results. Both theory and practice are emphasized by hands-on experience in order to foster a better understanding of and appreciation for fine points of survey methodology. Designed to familiarize the student with techniques and resources required to successfully design and carry out the field portion of an epidemiological investigation, including staff recruitment and training, counting and listing techniques, enumeration methodologies, subject recruitment, retention and tracking, data storage and management, and general survey instrument issues. It should be emphasized that this is not a specialized course in sampling theory and technique, and students are advised to become familiar with this material prior to taking or while enrolled in this course. Other course topics include a general overview of sampling methods and a review of and practice using survey-related software such as U.S. Census Tiger Files, Epi Info-Epi Map, Arc View GIS, CS Pro, etc. Issues of ethics, confidentiality, requirements for incident reporting, and features unique to conducting surveys in less-developed countries are discussed.

P9400 Case studies in causal thinking for epidemiologists, 4 points.

Prerequisites: *P9485* and two substantive courses in epidemiology. Intensive case studies involving the application of epidemiologic principles, with special emphasis on causal inference and judgments. All students prepare a succinct review of the case for each class. The case is placed in context by the instructor, is presented by at least two students, and is discussed by the class.

P9407 Methods in molecular/genetic epidemiology, 3 points.

Prerequisites: *P8400* and *P8120 Analysis of categorical data*. Designed for students who want to pursue doctoral study/careers in the area of molecular/genetic epidemiology. Focus is on the methodological issues pertaining to epidemiologic research involving genetic and/or nongenetic biological markers. The goal is to train students on both the theoretical and relevant practical aspects of the design, conduct, and analysis of molecular/genetic epidemiologic research studies.

P9408 Epidemiology of infectious diseases II, 3 points.

Prerequisites: *P6400* and *P8406*. For students who have already taken *P8406 Epidemiology of communicable diseases I* and who are presently conducting or are planning to conduct an epidemiologic study in communicable disease. Objectives are to understand transmission dynamics, to apply concepts of molecular epidemiology to communicable diseases, and to understand approaches to ecological study design and intervention evaluation. The grade is based on preparation of a research protocol or manuscript for publication.

P9419 Master's thesis in epidemiology I, 1 point.

A master's thesis is required for both the M.P.H. and the M.S. degrees with a concentration in epidemiology. The thesis may represent empirical research, a fresh analysis of existing data, or a theoretical treatise. The student first registers for a one-semester, 1-point course (*Master's thesis in epidemiology I*) to develop a proposal in consultation with a faculty supervisor. This proposal is submitted to the Master's Programs Committee for approval.

P9420 Master's thesis in epidemiology II, 2 points.

Prerequisite: *P9419*. After the successful completion of *P9419 Master's thesis in epidemiology I*, students must register for *P9420 Master's thesis in epidemiology II*, which provides them with the tools to develop their master's thesis step-by-step from introduction to references. In addition, the course helps students to integrate epidemiological and statistical concepts by answering research questions.

P9446 Faculty-fellow seminar in psychiatric epidemiology, 1 point.

Primarily for fellows in the Psychiatric Epidemiology Training Program. Presentation and discussion of ongoing faculty and fellow research, plus guest speakers. Designed to provide constructive criticism of research in progress and to make fellows aware of current issues in psychiatric epidemiology.

P9480 Research seminars in epidemiology, 0.5 point each term.

Primarily for students with a concentration in epidemiology. Others welcome. Presentations on completed and ongoing research by faculty, invited speakers, and postdoctoral and predoctoral students. Exchanges on study design, data collection, and analysis and interpretation.

P9485 Advanced topics in epidemiologic methods, 3 points.

Prerequisites: Course for advanced doctoral students in epidemiology. Students must be in their last year of coursework. Students outside the Department of Epidemiology require instructor's permission. Engages participants in current core debates about basic epidemiologic concepts and methods. Structured as a reading seminar. Articles and questions are assigned each week that tackle some aspect of these overarching debates. Goal is to develop an intellectual community that grapples seriously and deeply with critiques of epidemiologic methods.

P6490, P8490, and P9490 Tutorials in epidemiology, 1–6 points.

Independent research with individual faculty. Tailored to the particular interests and needs of the individual student. May include literature review, research projects, or other special studies that enrich the student's program.

P9493 Topics in epidemiology of neurological disorders, 3 points.

Prerequisites: *P6103* and *P6400*. Epidemiology of selected neurological disorders, including stroke, epilepsy, multiple sclerosis, motor neuron disease, myasthenia gravis, muscular dystrophy, primary brain tumor, Parkinson syndrome, dementia, and presumptive slow virus diseases. Paper and exam.

Also:

Offered through the Department of Environmental Health Sciences:

P8301 Gene-environment interactions in human disease

P8307 Molecular epidemiology

Offered through the Heilbrunn Department of Population and Family Health:

P8679 Investigative methods in humanitarian emergencies

Offered through the Department of Sociomedical Sciences:

P6781 The use of large-scale national health care data sets

P8725 Global AIDS policy

P8740 History of epidemiology

P8763 Stigma, prejudice, and discrimination as social stressors