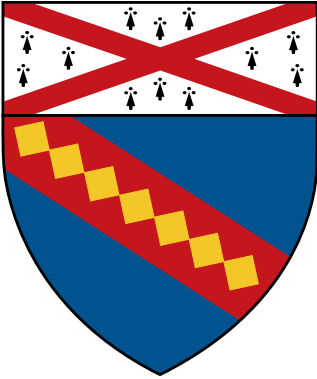


School of Public Health 2015–2016



BULLETIN OF YALE UNIVERSITY

Series 111 Number 11 August 15, 2015

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The University reserves the right to withdraw or modify the courses of instruction or to change the instructors at any time.

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School of Public Health

2015–2016

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Contents

Academic and Grading Calendars	5
The President and Fellows of Yale University	7
The Officers of Yale University	8
School of Public Health Administration and Faculty	9
Faculty Profiles	15
History of the Yale School of Public Health	32
Master of Public Health	34
Core Curriculum for the Traditional Two-Year M.P.H. Degree Program	35
M.P.H. Departments, Divisions, Programs, Tracks, and Concentrations	36
B.A.-B.S./M.P.H. Select Program	50
Accelerated M.B.A./M.P.H. Program in Health Care Management	52
Advanced Professional M.P.H. Program	55
Master of Science in Public Health	66
Doctoral Degree	70
Course Descriptions	87
Biostatistics	87
Chronic Disease Epidemiology	93
Environmental Health Sciences	101
Epidemiology and Public Health	104
Epidemiology of Microbial Diseases	106
Health Policy and Management	110
Tuition, Expenses, and Financial Aid	116
Academic Policies	122
Faculty Advisers	122
Course Registration	122
Course Withdrawal	123
Exemption from Required Courses	123
Grading System	123
Tutorial Support	124
Academic Standards	125
Change of Department	125
Other Changes and Appeals in Educational Program	125
YSPH Committee on Academic and Professional Integrity (CAPI)	126
Administrative Policies	133
Leave of Absence	133
U.S. Military Leave Readmissions Policy	135
Student Grievances	136
Withdrawal from the M.P.H. Program	136
Human Investigation Safeguards	136
Additional Policies	137
Yale University Resources and Services	138
A Global University	138
Cultural Resources and Athletic Facilities	139

Health Services	141
Residence and Dining Facilities	145
Resource Office on Disabilities	146
Resources on Sexual Misconduct	146
Office of International Students and Scholars	148
Security	149
YSPH Resources for Students	150
Office of Student Affairs	150
Career Management Center	150
Library Services	151
Office of the Registrar	151
Office of Alumni Affairs	152
Office of Public Health Practice	152
Medical Center Resources and Programs	153
Office of Multicultural Affairs	153
Office of the Ombudsperson	153
Office for Women in Medicine	153
Interdisciplinary Research and Special Programs	153
Student Organizations and Committees	155
Student Government	155
University Committees	155
Special Interest Groups	156
Appendix I: YSPH Practice Requirement Guidelines	157
Appendix II: Thesis Guidelines	159
The Work of Yale University	164
Medical Center Map	167
Central Campus Map	168

Academic and Grading Calendars

ACADEMIC CALENDAR

Summer Term 2015

July 1	W	Classes begin for Advanced Professional M.P.H. and Accelerated M.B.A./M.P.H. summer session
Aug. 14	F	Classes end for Advanced Professional M.P.H. and Accelerated M.B.A./M.P.H. summer session

Fall Term 2015

Aug. 31–Sept. 1	M–T	Orientation for incoming students
Sept. 2	W	Fall-term classes begin
Sept. 4	F	<i>Monday classes meet</i>
Sept. 7	M	Labor Day. Classes do not meet
Sept. 16	W	Course registration deadline (late fee \$50)
Oct. 16	F	Last day to withdraw from a fall-term course without the course appearing on the transcript
Oct. 21–23	W–F	Regular classes do not meet Professional Skills Seminar (mandatory for first-year M.P.H. students)
Nov. 20	F	November recess begins, 6 p.m.
Nov. 30	M	Classes resume
Dec. 11	F	Last day to withdraw from a fall-term course Classes end, 6 p.m. Reading period begins*
Dec. 17–22	TH–T	Final examination period

Spring Term 2016

Jan. 19	T	Spring-term classes begin
Feb. 2	T	Course registration deadline (late fee \$50)
Mar. 11	F	Last day to withdraw from a spring-term course without the course appearing on the transcript Spring recess begins, 6 p.m.
Mar. 28	M	Classes resume
Apr. 29	F	Last day to withdraw from a spring-term course Classes end, 6 p.m. Reading period begins*
May 6–11	F–W	Final examination period
May 23	M	University Commencement

*Some classes may meet during the reading period.

GRADING CALENDAR

Aug. 28	F	Final grades due for AP M.P.H. and Accelerated M.B.A./ M.P.H. summer session
Jan. 11	M	Final fall-term grades due for all students
May 1	SU	Final thesis grades due
May 13	F	Final grades due for all graduating students
June 3	M	Final grades due for all returning students

The President and Fellows of Yale University

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Peter Salovey, A.B., M.A., Ph.D.

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Her Honor the Lieutenant Governor of Connecticut, *ex officio*

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Emmett John Rice, Jr., B.A., M.B.A., Bethesda, Maryland (*June 2017*)

Eve Hart Rice, B.A., M.D., Bedford, New York (*June 2021*)

Kevin Patrick Ryan, B.A., M.B.A., New York, New York (*June 2018*)

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Effective September 1, 2015

School of Public Health Administration and Faculty

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Hong Wang, M.D., Ph.D., Associate Clinical Professor
Reza Yaesoubi, Ph.D., Assistant Professor

Faculty Profiles

Paul D. Cleary Anna M. R. Lauder Professor and Dean of Public Health. Dean Cleary's research includes developing better methods for using patient reports about their care and health status to evaluate the quality of medical care and studying the relationships between clinician and organizational characteristics and the quality of medical care. His recent research includes a study of how organizational characteristics affect the costs and quality of care for persons with AIDS, a national evaluation of a continuous quality improvement initiative in clinics providing care to HIV-infected individuals, developing Web-based decision tools to improve cancer care decision making, and a study of the long-term impact of patient-centered hospital care. He also is principal investigator of one of the Consumer Assessment of Healthcare Providers and Systems (CAHPS) grants funded by the Agency for Health Care Policy and Research to develop surveys for collecting information from consumers regarding their health plans and services. Ph.D. University of Wisconsin

Brian P. Leaderer Susan Dwight Bliss Professor of Epidemiology, Department of Environmental Health Sciences, and Deputy Dean of Public Health. Professor Leaderer's research activities focus on developing tools and methods for assessing human exposures to air contaminants, and assessing the impact of health and comfort resulting from those exposures. His research involves both controlled human studies conducted in environmental chambers and epidemiologic studies. Professor Leaderer's chamber-based research includes characterizing air emissions from important indoor sources (environmental tobacco smoke [ETS], kerosene space heaters, building materials and building furnishings), developing inexpensive passive monitors for monitoring concentrations of indoor air contaminants (i.e., ETS and nitrous acid), and assessing the odor and irritation of emissions of volatile organic compounds from building furnishings. Professor Leaderer's air pollution epidemiologic research studies include assessing the impact of particle and vapor phase acids on the respiratory health of infants and their mothers; determining the impact of ETS exposure on pregnancy outcome; assessing the impact of environmental agents (residential aeroallergens, suspended particles, ozone, etc.) on the development and severity of asthma in children; investigating the nature and causes of the building-related occupancy complaint syndrome (BROCS); and a study of the impact of unvented wood burning for cooking on the birthweights of infants and incidence of childhood pneumonia in the Mam Indians in Quetzaltenango in the highlands of Guatemala. Professor Leaderer is codirector of the Yale Center for Perinatal, Pediatric, and Environmental Epidemiology. M.P.H., Ph.D. Yale University

Serap Aksoy Professor, Department of Epidemiology of Microbial Diseases. A major goal of Professor Aksoy's research is to understand the molecular mechanisms that enable tsetse to transmit trypanosomes, in particular insect midgut and salivary gland gene products that may allow the parasites to differentiate and establish. Ph.D. Columbia University

Jonathan B. Borak Clinical Professor, Department of Environmental Health Sciences. Dr. Borak's research/scholarly activities during the past fifteen years have mainly

addressed the human toxicology of industrial chemicals. At first, his activities focused on acute high-dose exposures to “hazardous materials.” His more recent work has focused on the quality of toxicological data utilized in quantitative risk assessments. Of particular interest have been the methods and adequacy of exposure assessments and the nature of susceptible populations. A number of his published studies were based on data that were initially compiled and presented to regulatory agencies (e.g., USEPA, OSHA) and advisory boards (e.g., NAS, ACGIH), and have proven influential. M.D. New York University

Michael B. Bracken Susan Dwight Bliss Professor of Epidemiology, Department of Chronic Disease Epidemiology. Professor Bracken’s primary research interest is in the area of the epidemiology of diseases of pregnancy, newborns, and early childhood with an emphasis on genetic and environmental risk factors for causation and iatrogenic factors in patient care. Professor Bracken is codirector of the Yale Center for Perinatal, Pediatric, and Environmental Epidemiology. He has been the recipient of numerous grant awards and has published more than three hundred papers, chapters, and reports, and two books: *Perinatal Epidemiology* (Oxford, 1984) and *Effective Care of the Newborn Infant* (with J. C. Sinclair, Oxford, 1992). M.P.H., Ph.D. Yale University

Elizabeth H. Bradley Professor, Department of Health Policy and Management, and Director of Global Health Initiatives. Professor Bradley’s research interests span domestic and international health care quality with focus on quality improvement and outcomes research. She is working on two projects to improve cardiovascular care as well as hospice care in the United States, and she also leads several projects aimed at health system strengthening in Ethiopia, Liberia, South Africa, and China. M.B.A. University of Chicago; Ph.D. Yale University

Susan H. Busch Professor, Department of Health Policy and Management. Professor Busch conducts health services research on the treatment of depression and managed care. She has extensive training in management and economics. Ph.D. Harvard University

Xi Chen Assistant Professor, Department of Health Policy and Management. Professor Chen’s research focuses on social and economic behaviors and their consequences in underdeveloped contexts. His recent research involves his own fieldwork examining social interactions on stigmatized behavior, escalating gift spending, and early child health. His research attempts to offer more plausible explanations to the Deaton food puzzle and questions conventional anti-poverty programs that do not fully understand social customs. He also explores how demographic characteristics in China, as a result of son preference and the one-child policy, affect consumption and income-generating behavior as well as public health. Ph.D. Cornell University

Maria Ciarleglio Assistant Professor, Department of Biostatistics. Professor Ciarleglio’s primary research interest focuses on the design, conduct, and analysis of clinical trials, particularly the integration of Bayesian methodology into frequentist sample size determination and monitoring. She is also interested in studying family resilience, coping, and mental health problems in the active duty military population. Ph.D. Yale University

Elizabeth B. Claus Professor and Director of Medical Research, Department of Biostatistics. Dr. Claus’s work has focused on (1) cancer and genetic epidemiology, with an

emphasis on breast cancer, and (2) the development and implementation of statistical models of cancer risk. She has recently completed a state-wide population-based case/control study of breast carcinoma in situ. This is the largest prospective study of its type and will be used to define genetic and epidemiologic risk factors for the disease. Over the next five years, Dr. Claus will follow this group of women in an effort to define factors that predict medical and quality-of-life outcomes for women diagnosed with breast carcinoma in situ. In addition to her work in breast cancer, Dr. Claus's research interests include the study of neurosurgical outcomes, particularly for pediatric patients. M.D., Ph.D. Yale University

Theodore H. Cohen Associate Professor, Department of Epidemiology of Microbial Diseases. Professor Cohen's research focuses on the transmission dynamics of infectious diseases of global public health importance. Pathogens of particular interest include TB and HIV. His work incorporates mathematical modeling and statistical analysis of surveillance data and observational studies, with current field studies based in South America, southern Africa, and eastern Europe. M.D. Duke University; M.P.H. University of North Carolina at Chapel Hill; Dr.P.H. Harvard School of Public Health

Zack Cooper Assistant Professor, Department of Health Policy and Management. Professor Cooper's work focuses on investigating the causes of variation in health care providers' productivity within and across countries and understanding how competition, transparency, and financial incentives operate in hospital and insurance markets. His current research includes three projects. The first is using patient-level data from three large commercial insurers to look at the causes of variation in hospital prices across the United States. The second is using data from the Netherlands, the United States, Canada, and England to compare hospital productivity across the four countries. The third project is a large-scale randomized control trial investigating the impact of good hospital management on patient outcomes and hospital spending. Ph.D. The London School of Economics

Forrest W. Crawford Assistant Professor, Department of Biostatistics. Professor Crawford's work focuses on statistical methods for learning from stochastic processes in genetics, evolution, epidemiology, neuroscience, and public health. His ongoing projects include studies of evolutionary dynamics of infectious diseases, intra-host viral evolution, human microbiome analysis, DNA sequence alignment, DNA forensics, reporting error models for self-reported quantities in surveys, and analysis of medical image data. He is also interested in theoretical and methodological issues in statistical inference, including probabilistic matrix factorization, regularization for high-dimensional regression problems, Bayesian nonparametrics, and optimization. Ph.D. University of California, Los Angeles

J. Lucian Davis Associate Professor, Department of Epidemiology of Microbial Diseases. Dr. Davis's research focuses on tuberculosis (TB) diagnosis in resource-constrained settings domestically and internationally. He is interested in how novel tests for TB diagnosis, prediction, and monitoring can be integrated into evaluation strategies to improve patient and public health outcomes. Current projects include TB biomarker discovery studies applying exosome-targeted proteomics and human and TB transcriptomics to

patient samples from Uganda and Vietnam; and implementation research in Uganda and the United States using novel diagnostic and mobile information and communication technologies to help clinics and communities improve TB evaluation and case-finding. Dr. Davis is also engaged in training and capacity building as co-director of a Uganda Fogarty Research Training Program in Pulmonary Complications of HIV, and as president of Walimu, a foundation directing evidence-based training and implementation initiatives to improve care of lung disease and severe acute illness in low-income countries. M.D. Vanderbilt University, M.A.S. University of California San Francisco

Mayur M. Desai Associate Professor, Department of Chronic Disease Epidemiology, and Director of the Advanced Professional M.P.H. Program. Professor Desai's research interests focus on: (1) improving the quality and outcomes of medical care in complex and vulnerable populations, including persons with mental disorders, veterans, immigrants, and the elderly; and (2) workforce issues in public health and medicine. His interests also include psychosocial and psychiatric epidemiology, cardiovascular disease, and health services research. Professor Desai teaches courses on epidemiologic research methods and data analysis. M.P.H., Ph.D. Yale University

Andrew T. DeWan Associate Professor, Department of Chronic Disease Epidemiology. Professor DeWan's research interest is to understand how variation in the human genome contributes to complex human diseases. His current work uses high-throughput methods to conduct genome-wide association studies to map disease susceptibility loci as well as developing methods to improve how this information is utilized and interpreted. He is also interested in identifying genetic and environmental factors that interact and contribute to disease susceptibility. M.P.H. University of Minnesota, Ph.D. Rockefeller University

Nicole C. Deziel Assistant Professor, Department of Environmental Health Sciences. Professor Deziel's research seeks to evaluate and improve environmental exposure assessment methods for application in epidemiologic studies. She examines the relative contribution of different exposure pathways and studies how well indirect exposure measures, such as questionnaire- or GIS-based metrics, compare to biological or environmental measurements. She investigates several classes of pollutants, including pesticides, polycyclic aromatic hydrocarbons, and persistent organic pollutants. Professor Deziel is particularly interested in women's and children's health outcomes and cancer. She is affiliated with the Center for Perinatal, Pediatric, and Environmental Epidemiology (CPPEE). M.H.S., Ph.D. Johns Hopkins University

Arthur B. DuBois Professor Emeritus, Department of Environmental Health Sciences. Dr. DuBois's research activities concern nitric oxide emanating from the lungs and nasal cavity in humans and in animals. One object is to find out whether inflammation of the lungs produces more nitric oxide, and whether that gas can be used as a measure of the amount of lung irritation during health surveys. Another object is to determine why nitric oxide concentrations in the human nose can be a thousand times as great as those in the air expired from the lungs of the same person. Dr. DuBois's recent interests have concerned mechanisms by which inhaled dust particles initiate bronchoconstriction

and immune responses in the lung alveoli. His summer research has included brain tissue hypoxia as it affects the blood pressure of bluefish. Past studies have been on body fluid redistribution in gravity and under weightless conditions. Previously, his primary research was on pulmonary physiology and lung function in normal people and in people with respiratory insufficiency. M.D. Cornell University

Robert D. Dubrow Professor, Department of Chronic Disease Epidemiology. Dr. Dubrow has been heavily involved in public health education, as well as in research. He is a cancer epidemiologist whose current research focuses on two areas: glioma and HIV-related malignancies. He has published on the descriptive epidemiology of glioma, dietary risk factors for glioma, and glioblastoma outcomes. With regard to HIV-related malignancies, he has published on liver cancer, anal cancer, and lung cancer in HIV-infected persons. Dr. Dubrow serves as chair of the Veterans Aging Cohort Study Cancer Core and cochair of the North American AIDS Cohort Collaboration on Research and Design (NA-ACCORD) Malignancy Working Group. M.D., Ph.D. University of Pennsylvania

Denise Esserman Associate Professor, Department of Biostatistics. Professor Esserman's work has largely focused on the application of statistical methods in longitudinal data analysis, missing data, and survey methodology. She has worked on a large array of projects, from basic science to clinical trials to large secondary data analysis to implementation science, as well as across many disciplines, including Hepatitis C, medication adherence, pediatric obesity, autism, and hypertension. Ph.D. Columbia University

Durland Fish Professor Emeritus and Senior Research Scientist, Department of Epidemiology of Microbial Diseases. Professor Fish's research interests are in the areas of ecology and prevention of vector-borne infectious diseases. Recent emphasis has been on tick-borne pathogens causing Lyme disease and human ehrlichiosis in the northeastern United States. Current projects include natural and artificial regulation of vector populations, vector competence for viral and bacterial pathogens, co-infection and transmissions of multiple pathogens, geographic and spatial analysis of epidemiological data, and use of satellite imagery to predict vector-borne disease risk. Ph.D. University of Florida

Abigail S. Friedman Assistant Professor, Department of Health Policy and Management. Professor Friedman's research applies behavioral and health economics to better understand why individuals engage in costly health behaviors and health-related decision making, with particular attention to the role of mental health as well as implications for population-level disparities. Ranging from studies of risky health behaviors to the behavioral economics of Medicare plan choice, her work seeks to both clarify the underpinnings of such decisions and identify mechanisms of influence, thereby informing policies to improve population health and reduce inequality. Ph.D. Harvard University

Alison P. Galvani Professor, Department of Epidemiology of Microbial Diseases. Professor Galvani is focusing her research on theoretical modeling of the evolution and epidemiology of infectious diseases. She is particularly interested in evaluating both the short-term and long-term repercussions of different public health policies on the prevalence and intensity of disease, including emerging diseases. Ph.D. University of Oxford

Nicola L. Hawley Assistant Professor, Department of Chronic Disease Epidemiology. Professor Hawley's research focuses on obesity and related noncommunicable diseases. She is particularly interested in the developmental origins of obesity, specifically obesity in pregnancy and its consequences for maternal outcomes and offspring obesity; and infant growth, feeding behaviors, and later cardio-metabolic risk. She has ongoing projects and collaborations in American Samoa, Independent Samoa, South Africa, and the United States. Ph.D. Loughborough University, UK

Robert Heimer Professor, Department of Epidemiology of Microbial Diseases. Professor Heimer's major research efforts include scientific evaluation of HIV prevention programs for drug injectors, virological assessment of the risk of drug injection behaviors, and analysis of the interrelationship between hepatitis virus infections and injection drug use. Ph.D. Yale University

Josephine Hoh Associate Professor, Department of Environmental Health Sciences. Professor Hoh's current research focuses on developing analytical methods in mapping genetic origins and assessing environmental risks in human diseases and complex traits, and functional genomic and evolutionary studies of p53 responsive genes. Ph.D. Rutgers University

Theodore R. Holford Susan Dwight Bliss Professor of Public Health, Department of Biostatistics. Professor Holford's primary research interests are in the development and application of statistical methods in public health and medicine. One topic he has especially focused on recently has been how trends in cancer epidemiology are described, especially through the use of age-period-cohort models. The development and application of statistical models that incorporate the underlying biology motivate other aspects of his research as well. His collaboration with the National Acute Spinal Cord Injury Study has led to the development of new ways of analyzing data collected from clinical trials of patients who have this type of injury. These methods enable investigators to better understand the effect of improvements in overall neurological function by separating the components due to the level on the spinal cord that is injured and the severity of that injury. Ph.D. Yale University

Jeannette R. Ickovics Professor, Department of Chronic Disease Epidemiology. Professor Ickovics's research lies at the intersection between public health and psychology. She investigates the interplay of the complex psychological, medical, and social factors that influence the health of the person and of the community. She uses this lens to examine the challenges faced by those who have often been marginalized by the health care system and by society. She is an authority on women's health, with a particular focus on HIV/AIDS (including both prevention and adjustment to disease) as well as more general research on the interaction of biomedical and psychosocial factors that promote good health and recovery. Professor Ickovics's recent research has been directed toward a series of community-based longitudinal studies examining the associations between adolescent pregnancy and risk for sexually transmitted diseases and HIV. She is currently conducting large randomized controlled trials on the effects of "bundled" group prenatal care on diverse reproductive health outcomes. Professor Ickovics is director of CARE:

Community Alliance for Research and Engagement, which works on a large research initiative linking neighborhood revitalization and health. Ph.D. George Washington University

Melinda L. Irwin Professor, Department of Chronic Disease Epidemiology. Professor Irwin's primary research interests are in the area of physical activity and cancer prevention and prognosis. She is trained in exercise physiology, epidemiology, and clinical trials. Specifically, Professor Irwin's research involves the exercise effect on breast cancer biomarkers among high-risk individuals and cancer survivors. Other ongoing research includes determinants of exercise adherence and physical activity methodology. M.P.H. University of Washington; Ph.D. University of South Carolina

Anne Marie Z. Jukic Assistant Professor of Epidemiology, Department of Chronic Disease Epidemiology. Professor Jukic's primary research interests are fertility, endocrinology, early pregnancy, and pregnancy outcomes. Her research focuses on environmental and nutritional risk factors for subfertility, pregnancy loss, and growth restriction with a specific interest in vitamin D. She is also interested in the methodological challenges of studying reproductive and perinatal endpoints. M.S.P.H. Emory University, Ph.D. University of North Carolina at Chapel Hill

Danya E. Keene Assistant Professor, Department of Chronic Disease Epidemiology, Social and Behavioral Sciences Division. Professor Keene's mixed-methods research broadly explores how social policies contribute to health inequality, with a particular focus on issues related to housing, neighborhoods, and place. For example, her work has examined how urban revitalization and public housing demolition may affect the health of low-income African American communities in Chicago, Atlanta, and nationally. She is also conducting mixed-methods research that explores linkages between home foreclosure and health. Professor Keene is also interested in social stigma and its relationship to geographic and social inequality. For example, she is conducting research that considers negative representations of place or "spatial stigma" as an understudied mechanism that connects places to the health of their residents. Ph.D. University of Michigan

Trace S. Kershaw Associate Professor, Department of Chronic Disease Epidemiology, and Division Head, Social and Behavioral Sciences Division. Professor Kershaw's research is in the area of HIV/STD prevention and reproductive and maternal-child health epidemiology. Specifically, Professor Kershaw is interested in integrating HIV/STD and unwanted pregnancy prevention with prenatal and postnatal care for young high-risk women and their male partners. He is currently involved in several research projects assessing the influence of behavioral interventions aimed to reduce the occurrence of HIV/STD and negative perinatal and postnatal outcomes (e.g., low birth weight, maternal mortality) for young pregnant women in the United States and abroad (e.g., South Africa, Haiti). M.P.H. Yale University; Ph.D. Wayne State University

Kaveh Khoshnood Associate Professor, Department of Epidemiology of Microbial Diseases, and Director of Undergraduate Studies. Professor Khoshnood is involved in several studies of HIV infection and health service utilization among drug users. His other areas of research interest are program evaluation, drug policy reform, and the linkage between health and human rights. M.P.H., Ph.D. Yale University

Albert I. Ko Professor and Chair, Department of Epidemiology of Microbial Diseases. Dr. Ko's research focuses on infectious diseases that have emerged as a consequence of rapid urbanization and urban poverty. He coordinates a research and training program in Brazil and is particularly interested in understanding the natural history of leptospirosis, a spirochetal disease that has become a health problem in urban slum environments due to rat-borne transmission. Current projects include (1) prospectively studying a cohort of slum residents to identify risk factors for leptospirosis and determine the effectiveness of sanitation programs as a prevention measure, (2) characterizing pathogen-related factors that influence the development of severe disease outcomes such as pulmonary hemorrhage, and (3) developing rapid diagnostics and vaccine candidates for this neglected tropical disease. Dr. Ko's group is also conducting community-based research on other urban slum health problems, including bacterial meningitis, vaccine-preventable diseases, and dengue. All of these projects combine field epidemiology and translational research approaches to identify intervention strategies that can be implemented in urban slum communities. M.D. Harvard University

Becca R. Levy Associate Professor, Department of Chronic Disease Epidemiology. Professor Levy's research explores psychosocial influences on aging. Her studies focus on how these influences, particularly older individuals' perceptions of aging, affect cognition and health in old age. She studies this by examining: (1) how the aging process differs among cultures that vary in their stereotypes of aging; and (2) how a psychosocial intervention, designed to trigger either positive or negative perceptions of aging, influences a variety of outcomes in older individuals including memory, physical performance, and cardiovascular response to stress. In addition, Professor Levy examines how psychosocial factors influence recovery and survival in old age. Ph.D. Harvard University

Judith H. Lichtman Associate Professor and Chair, Department of Chronic Disease Epidemiology. Professor Lichtman's research covers a broad range of cardiovascular diseases including myocardial infarction, stroke, and congestive heart failure. In addition to studying clinical factors associated with disease prevention, she has been interested in the development of risk stratification scales to identify individuals at greatest risk for recurrent vascular events. A specific focus of her research has been the overlap between vascular diseases, such as the risk of stroke following myocardial infarction. Her current research includes the development of a longitudinal, patient-linked Medicare database to examine clinical aspects of cardiovascular, peripheral vascular, and cerebrovascular disease in the elderly. This work will examine the rates and trends of vascular disease over time, the utilization of vascular procedures, and short- and long-term vascular outcomes including mortality and recurrent illness. An important component of this research will be to determine how rates and outcomes vary by age, race, gender, and geographic location. M.P.H., Ph.D. Yale University

Haiqun Lin Associate Professor, Department of Biostatistics. Dr. Lin's primary research interests concern the development, implementation, and application of statistical methods in longitudinal biomarkers for disease processes. Her research activity has been directed toward characterizing the joint responses of the longitudinal PSA readings and prostate cancer incidence utilizing mixture models. She had been trained in medicine

and molecular and cellular biology prior to a formal education in statistics. M.D. Beijing Medical University; Ph.D. Cornell University

Shuangge Ma Associate Professor, Department of Biostatistics. Professor Ma's research interests include analysis of interval-censored survival data and regularized estimation with applications to analysis of high-dimensional genomic data. He is currently working on analysis of case I interval-censored data with cure proportion and analysis of genomic data with clustering structures. He is also interested in clinical trial design, cardiovascular study, and HIV study. Ph.D. University of Wisconsin

Xiaomei Ma Associate Professor, Department of Chronic Disease Epidemiology. Professor Ma's research interest is in the etiology of chronic noninfectious diseases, particularly cancer. She has been studying the role of immunologic factors and environmental chemical exposures in the etiology of childhood leukemia for the last few years. She is also interested in molecular classification and genetic susceptibility of the disease. Other ongoing research includes methodological issues in selection of control subjects in case control studies, and DNA methylation in leukemia cases. M.S. Shanghai Medical University; Ph.D. University of California, Berkeley

Robert W. Makuch Professor, Department of Biostatistics, and Director, Regulatory Affairs Track. Professor Makuch's primary research interests involve methodologic issues in the design, conduct, and analysis of clinical studies. In particular, he is interested in the appropriate design and analysis of active control equivalence studies, and he has described how controls should be selected, how the sample size for these studies is determined, and what constitutes appropriate methods of analysis. Interim analysis in general, and the development and application of conditional power methodology in particular, is another active research area. These methods have been used in numerous settings, including a multicenter, Yale-based study for the identification of a new therapy for the treatment of intraventricular hemorrhage. Analytic areas of interest include prospective individual matching designs and methods for the analysis of longitudinal data. These methodological developments have been directed primarily in the area of cancer and HIV. Ph.D. Yale University

Lawrence E. Marks Professor, Department of Environmental Health Sciences. Professor Marks's research interests focus on the development of quantitative models to account for human sensory and perceptual responses to environmental stimuli. One interest is the perception of flavors of foods. A goal is to understand better how food flavors guide eating behaviors and food intake. This line of research focuses on mechanisms by which stimulations of flavor receptors in the mouth (gustation) and nose (olfaction) interact to allow rapid detection and identification of flavors. A second interest is the role of selective attention in perception. This line of research asks how attention to particular stimuli increases speed and accuracy in perceiving those stimuli. A third interest is in synesthesia in perception. A small portion of the population consistently experiences unusual perceptions involving "secondary" sensory qualities, for instance, seeing shapes and colors when hearing sounds. This line of research aims at clarifying the place of synesthesia in perception, language, and cognition. Ph.D. Harvard University

Diane McMahon-Pratt Professor, Department of Epidemiology of Microbial Diseases, and Director of Postdoctoral Affairs. The focus of the research in Professor McMahon-Pratt's laboratory is the genus of parasitic protozoan, *Leishmania*, which causes a spectrum of diseases known as leishmaniasis. Using biochemical and molecular genetic approaches, the laboratory is involved in the study of molecules that are developmentally regulated by the parasite during its life cycle; these molecules should provide clues as to how the parasite survives and/or manipulates its environment within either the insect vector or mammalian host. She is also interested in understanding and elucidating the immune effector mechanisms involved in the control of infection by the mammalian host. Ph.D. Harvard University

Joan Monin Assistant Professor, Department of Chronic Disease Epidemiology. Professor Monin's research examines how emotional processes affect health in older adult relationships. Currently her research focuses on understanding how exposure to a loved one's suffering affects the physical and psychological health of older adult caregivers. Her research combines survey methods and laboratory experiments to understand the mechanisms (e.g., emotional contagion, cardiovascular reactivity) and moderators (gender, individual differences in attachment) involved in these processes. Ph.D. Carnegie Mellon University

Chimaeze D. Ndumele Assistant Professor, Department of Health Policy and Management. Professor Ndumele's research is centered on identifying the drivers of inequitable access to health care services for vulnerable populations. His work commonly examines the impact of organizational structure and changes in local and federal policy on the provision and use of health services. Current research includes a group of studies aiming to forecast the likely effects of the forthcoming Medicaid expansion; the evaluation of a natural experiment that randomly assigned Medicaid enrollees to one of two types of managed care plans; and work exploring the effects of transitioning from Medicaid to Medicare on the use of health services. Ph.D. Brown University

Ingrid M. Nembhard Associate Professor, Health Care Management Program, Department of Health Policy and Management. Professor Nembhard studies the effects of leadership behavior, front-line staff interactions, team learning strategies, and inter-organizational relationships on quality improvement efforts and clinical outcomes. She integrates knowledge of organizational behavior, organizational theory, and health services research to answer questions about managing learning, change, and innovation within health care delivery organizations. Ph.D. Harvard University

Linda M. Niccolai Associate Professor, Department of Epidemiology of Microbial Diseases. Professor Niccolai's primary research interest is in behavioral aspects of HIV and STD prevention. Specifically she is interested in studying individual- and partnership-level determinants of sexual risk behaviors, particularly among underserved populations. Other ongoing research activities include studies of woman's reproductive health (including pregnant women) and HIV/STD prevention. Ph.D. Tulane University

John E. Pachankis Associate Professor, Department of Chronic Disease Epidemiology, Social and Behavioral Sciences Division. Professor Pachankis's research focuses on the health of lesbian, gay, bisexual, and transgender (LGBT) individuals. His research seeks

to identify the psychosocial (e.g., concealment, rejection sensitivity) and contextual (e.g., urban migration) processes underlying LGBT individuals' disproportionate experiences with adverse mental and physical health outcomes. His research combines social and clinical psychological methods and life course developmental models to inform investigations into stigma, LGBT mental health, and LGBT health intervention development. He is currently involved in several projects aiming to develop and disseminate behavioral interventions to improve the health of the LGBT community. Ph.D. State University of New York at Stony Brook

A. David Paltiel Professor and Interim Chair, Department of Health Policy and Management. Professor Paltiel is engaged in numerous research projects concerned broadly with issues of resource allocation and decision making in the health sector. His work focuses on the development of methods and models for the economic evaluation of a variety of pharmaceutical products, medical technologies, and public health activities. He has published on such subjects as the costs and consequences of antiretroviral therapy, the economics of HIV and cancer screening, the theoretical foundations of cost-effectiveness analysis for resource allocation, optimal timing and targeting policies for AIDS prevention and treatment policies, and the cost-effectiveness of preventing AIDS complications. Ph.D. Yale University

Sunil Parikh Assistant Professor, Department of Epidemiology of Microbial Diseases. Dr. Parikh's research interests focus on translational studies of malaria in sub-Saharan Africa. He focuses upon several aspects of malaria: early immune responses to infection, human genetics, and treatment. Current projects include: (1) understanding the pharmacokinetics and pharmacodynamics of antimalarials using a combination of individual and population-based approaches to inform treatment guidelines; (2) characterizing the impact of pharmacogenetic variants on drug metabolism and treatment outcomes; (3) understanding the impact of the HIV epidemic on the treatment of malaria in co-endemic regions; and (4) characterizing the impact of host transcriptional and genetic variability in early immune responses to malaria. Dr. Parikh has ongoing projects in several African countries, including Uganda, Burkina Faso, and Nigeria. M.D. Johns Hopkins University School of Medicine; M.P.H. University of California, Berkeley

Curtis L. Patton Professor Emeritus, Department of Epidemiology of Microbial Diseases. Professor Patton's research interests include identification and characterization of trypanosome-specific calmodulin response elements, as well as studies of structure and biological function of trypanosome calmodulin. Under physiological conditions, treatment with methylating agents induces synchronous differentiation in these parasites. In his research Professor Patton is characterizing carboxyl methyltransferases and methylesterases and determining the role of S-adenosyl-methionine and decarboxylated S-adenosylmethionine in alpha-difluoromethylornithine-induced differentiation. Ph.D. Michigan State University

Peter N. Peduzzi Professor, Department of Biostatistics, and Director, Yale Center for Analytical Sciences. Professor Peduzzi's primary research interests involve the development of statistical methods for the design, conduct, and analysis of clinical trials and research on aging. In particular, he is interested in the design and analysis of comparative

effectiveness clinical trials to evaluate the relative effectiveness of different options for treating a specific medical condition in a selected population, including the determination of which patients benefit most from treatment. Other research activities include matching of Bayesian and frequentist approaches to sample size and monitoring of clinical trials and analyzing longitudinal studies in which death is a competing event. He is also principal investigator of the VA Cooperative Studies Program Coordinating Center at the VA Connecticut Healthcare System, West Haven, Connecticut, and the codirector of the Biostatistics Core of the Yale Pepper Center. Ph.D. Yale University

Rafael Pérez-Escamilla Professor, Department of Chronic Disease Epidemiology; Director, Office of Public Health Practice; and Director, Global Health Concentration. Professor Pérez-Escamilla's research program concentrates on domestic and global community/public health nutrition issues including (1) efficacy and effectiveness of community health worker models for improving behavioral, metabolic, and disease outcomes among Latinos with type 2 diabetes, (2) prenatal and infant nutrition, (3) household food security measurement and policies, (4) growth and development of infants born to HIV-positive women, and (5) nutrition education program design and evaluation. He is currently (co)leading health disparities, nutrition, and food security capacity building programs in Connecticut, Ghana, and Brazil. All of his projects include strong community outreach and workforce development efforts to help translate scientific findings into improved practices and health outcomes at the community level. Ph.D. University of California, Davis

Melinda M. Pettigrew Associate Professor, Department of Epidemiology of Microbial Diseases, and Associate Dean for Academic Affairs. Professor Pettigrew uses a combined molecular and epidemiologic approach to understand infectious diseases in infants and young children. Her main projects involve the identification of bacterial factors important for the pathogenesis of pneumococcal infections and an analysis of the impact of environmental exposures on otitis media. Ph.D. Yale University

Virginia E. Pitzer Assistant Professor, Department of Epidemiology of Microbial Diseases. Professor Pitzer's research focuses on mathematical modeling of the transmission dynamics of imperfectly immunizing infections. She studies how interventions such as vaccination, improved treatment of cases, and improvements in sanitation affect disease transmission at the population level. Her primary research focus is on rotavirus, one of the leading causes of severe diarrhea in children in developed and developing countries, for which two new vaccines have been recently introduced. Current projects include (1) understanding the transmission dynamics and potential impact of vaccination in developing countries, and (2) developing and applying epidemiological methods to estimate the waning of vaccine-induced immunity for rotavirus. She is also interested in the spatiotemporal dynamics of RSV and evaluating control options for typhoid fever. Sc.D. Harvard School of Public Health

Harvey A. Risch Professor, Department of Chronic Disease Epidemiology. Dr. Risch's research interests are in the areas of cancer etiology and prevention, and in epidemiology methods. His work has included studies on the etiology of pancreatic, ovarian, and upper gastrointestinal neoplasms, with particular emphasis on genetic polymorphisms and

major genes, hormonal factors and cancer, occupational/environmental exposures and cancer, diet and cancer, and *Helicobacter pylori* and cancer. He has been principal investigator of two case-control studies of pancreatic cancer, in Connecticut and in Shanghai, China, and co-investigator on a third study in Queensland, Australia, as well as principal investigator of three large case-control studies of ovarian cancer, two in Canada and one in Connecticut, and a case-control study of esophageal and stomach cancer in Connecticut. He is associate editor of the *Journal of the National Cancer Institute* and of the *American Journal of Epidemiology*, and editor of the *International Journal of Cancer*. M.D. University of California, San Diego; Ph.D. University of Chicago

Nancy H. Ruddle John Rodman Paul Professor Emerita of Epidemiology and Public Health, Department of Epidemiology of Microbial Diseases. Professor Ruddle's laboratory is interested in several aspects of protein products of thymus-derived lymphocytes, particularly cytokines of the tumor necrosis factor (TNF) family, their regulation and roles in lymphoid development and pathogenesis of viral and autoimmune disease. Her laboratory has studied the regulation, mechanism of action, and biological role of a family of lymphokines called lymphotoxin (LT, LT α , TNF- β), LT- β and tumor necrosis factor (TNF- α). They have studied molecular regulation of LT, LT- β , and TNF- α production and identified negative and positive elements in the genes and flanking DNAs and evaluated different mechanisms of post-transcriptional regulation of these genes. They are studying the role of LT, LT- β , and TNF- α in pathogenesis of inflammation in diabetes, multiple sclerosis, and HTLV-1 hypercalcemia and have developed transgenic mouse models to study their activities in these diseases. Ph.D. Yale University

Mark J. Schlesinger Professor, Department of Health Policy and Management. Professor Schlesinger's health policy research includes assessments of federal programs for children and the elderly; studies of the growth of for-profit enterprises in health and mental health care; investigations of the scope and consequences of various forms of "managed care" and utilization management, including their application to "managed competition"; and analyses of public attitudes toward health care reform. His research on other aspects of social policy includes studies of government contracting for services from private agencies; public perceptions and attitudes shaping intergenerational tensions and age-targeted social programs; and the comparative performance of private nonprofit, for-profit, and public agencies. Ph.D. University of Wisconsin

Jason L. Schwartz Assistant Professor, Department of Health Policy and Management. Professor Schwartz's research examines the ways in which evidence is collected, interpreted, evaluated, and translated into regulation and policy in medicine and public health. Specific areas of interest include the regulation, promotion, and delivery of vaccines, particularly for children; the structure and function of scientific expert advice to government, particularly in U.S. health agencies; assessments of the risks and benefits of pharmaceuticals and other medical technologies; and the development and evolution of public health agencies and programs from the 1960s to the present. Ph.D. University of Pennsylvania

Fatma Shebl Assistant Professor, Department of Chronic Disease Epidemiology. Dr. Shebl's current research involves examining the role of inflammation and infection in

cancer risk. Dr. Shebl is mainly interested in hepatitis C virus research and is currently working with several collaborators to examine genetic and non-genetic determinants of spontaneous and drug-induced clearance. She also established new statistical analytic methods to estimate incidence rate in the presence of misclassification errors. In addition, she has special interest in introducing novel use of existing statistical methods to the field of epidemiology. Dr. Shebl's future research will focus on understanding cancer's molecular basis and identifying biomarkers for early cancer detection, especially for hepatocellular carcinoma. M.D. University of Alexandria, Egypt; Ph.D. University of Maryland

Jody L. Sindelar Professor, Department of Health Policy and Management. Professor Sindelar also has an appointment at the Institute of Social and Policy Studies at Yale and is a research associate at the National Bureau of Economics Research. She is president of the American Society of Health Economics, and serves on several advisory and editorial boards. Her primary research area is the economics of substance abuse including smoking, alcohol, illicit drugs, and obesity. Her work has been published in medical care, health services, addiction, and economics journals. Professor Sindelar has been a principal investigator on multiple grants with funding from NIAAA, NIDA, NIA, and the Robert Wood Johnson Foundation, among others. Current research interests include (1) analyzing the roles of socioeconomic factors, health habits, and work-life on the aging process, (2) the role of stress and self-control grant on stress and addiction as part of a roadmap grant, and (3) behavioral economics. Ph.D. Stanford University

Jeffrey P. Townsend Associate Professor, Department of Biostatistics, and Director of Bioinformatics, Yale Center for Analytical Sciences. Professor Townsend's research interests include bioinformatics, mathematical modeling, and gene expression analysis. Research topics include the estimation of selection coefficients on mutations within genes and pathways that underlie the somatic evolution of cancer, and global sensitivity and uncertainty analyses of dynamic infectious disease models. Professor Townsend also performs research on the evolution of gene expression using pathogenic and nonpathogenic fungi, including the model yeast *Saccharomyces cerevisiae* and the model filamentous fungus *Neurospora crassa*. Ph.D. Harvard University

Christian Tschudi Professor, Department of Epidemiology of Microbial Diseases, and Director of Graduate Studies. Professor Tschudi's studies focus on the biology of trypanosomes, the causative agent of devastating diseases in Africa and South America. Most projects utilize bioinformatics and modern genetic techniques to identify and dissect parasite-specific functions with the long-term goal to identify candidate molecules that can be targets for chemotherapy. He is also interested in understanding gene silencing by RNA interference in African trypanosomes with the objective of uncovering its biological function. Ph.D. University of Basel, Switzerland

Vasilis Vasilioiu Professor and Chair, Department of Environmental Health Sciences. Professor Vasilioiu has established an internationally recognized research program that has been continuously funded by NEI/NIH and NIAAA/NIH since 1997. His research interests include mechanisms of cellular responses to environmental stress, gene-environment interactions, the role of aldehyde dehydrogenases and glutathione in metabolism and disease (e.g., diabetes, gout, and cancer), and the evolution of gene

families. Drug discovery also represents an area of active interest, particularly given the recent identification of aldehyde dehydrogenases as markers of cancer stem cells. In a multi-investigator collaboration with several universities and the National Center for Advancing Translational Sciences (NCATS), Professor Vasiliou is developing small molecules that will enhance the efficacy of the chemotherapy and radiotherapy of cancer. Ph.D., Medical School, University of Ioannina, Greece

Shiyi Wang Assistant Professor, Department of Chronic Disease Epidemiology. Dr. Wang's primary interests focus on outcomes research and decision science. He is currently working on evaluation of preoperative breast magnetic resonance imaging (MRI) for women with newly diagnosed early breast cancer. He is interested in combining systematic literature reviews, simulation modeling, and secondary data analyses to examine issues that are critical to clinicians and policy makers' decision making. M.D. Taipei Medical University; Ph.D. University of Minnesota

Zuoheng Wang Assistant Professor, Department of Biostatistics. Professor Wang's research focuses on the development of statistical and computational methods to address problems in genetics, in particular, genome-wide association studies. Her current project involves identifying genomic variants contributing to type 2 diabetes. She is also interested in integrating information from genomics and expression experiments to understand the genetic basis of human complex diseases. Ph.D. University of Chicago

Daniel M. Weinberger Assistant Professor, Department of Epidemiology of Microbial Diseases. Dr. Weinberger's research focuses on the biology and epidemiology of pneumococcus, a major bacterial pathogen that causes a large burden of disease worldwide, particularly among young children and the elderly. Major research questions are related to bacterial evolution and strain dominance, bacterial-viral co-infections, and seasonal determinants of bacterial disease incidence. He also does work focused on improving the interpretation of disease surveillance data and understanding geographic variations in vaccine impact. These projects have direct relevance for interpreting post-vaccination disease data and for understanding the potential impacts of bacterial evolution on long-term vaccine effectiveness. The Weinberger lab employs a variety of tools including experimental and statistical approaches. Ph.D. Harvard University

Reza Yaesoubi Assistant Professor, Department of Health Policy and Management. Professor Yaesoubi's research focuses on medical decision making and model-based evaluation of health policies. His work incorporates mathematical and computer simulation models, statistical methods, and optimization techniques to guide resource allocation and decision making in public health and health delivery systems. He has applied these methods in conducting cost-effectiveness analyses of colorectal cancer screening strategies, estimating societal willingness-to-pay for health, and characterizing performance-based payment systems for preventive care systems. His current work mainly focuses on adaptive decision making to control the spread of infectious diseases including tuberculosis, influenza, and meningitis. He is also interested in theoretical and methodological issues in medical decision making including cost-effectiveness analysis, large-scale simulation modeling, Markov decision processes, approximate dynamic programming, game theory, and principal-agent models. Ph.D. North Carolina State University

Daniel Zelterman Professor, Department of Biostatistics. Professor Zelterman's research interests are centered in applied statistics. Before coming to Yale in 1995, he studied the limits of human longevity and models related to other extreme value models. He is currently doing research on clinical trials at the Yale Cancer Center. This research covers survival analysis, modeling of cancer mechanisms, and discrete distributions. His interests in cancer epidemiology and genetics have brought him to examine the analysis of pedigrees, familial clusters of disease, and similar computationally intensive statistical methods. Ph.D. Yale University

Heping Zhang Professor, Department of Biostatistics. Professor Zhang's research interests are in the general area of regression analysis: theory, methodology, and applications. Recently, he has been developing and implementing a nonparametric tree-based method that allows one to analyze data with multidimensional responses and with continuous and/or categorical covariates. This tree-based method is especially suitable for risk factor analyses of large, complex epidemiologic studies. Professor Zhang is also interested in statistical genetics and neuroimaging analyses. Ph.D. Stanford University

Yawei Zhang Associate Professor, Department of Environmental Health Sciences. Dr. Zhang's research interests are in the areas of cancer epidemiology, etiology, and prognosis. She is especially interested in the effects of environmental factors, endogenous and exogenous hormones, genetic susceptibility, and gene-environmental interactions on human cancer risk. Her main research projects involve environmental factors, genetic susceptibility, and non-Hodgkin's lymphoma; gene-environmental interactions and breast cancer risk; and early life exposures and breast and testicular cancer risk. M.D. West China University of Medical Science, China; M.P.H., Ph.D. Yale University

Hongyu Zhao Professor and Chair, Department of Biostatistics. Professor Zhao's research interests focus on applications of probability and statistics to molecular biology and genetics. The projects in his laboratory include (1) genome-wide association studies, (2) haplotype analysis in population-based and family-based studies, (3) eQTL mapping in different organisms, (4) pathway-based genomics analysis, (5) transcriptional regulatory network reconstruction, (6) protein interaction networks, and (7) disease biomarker identification through proteomics. Ph.D. University of California, Berkeley

Bingqing Zhou Assistant Professor, Department of Biostatistics. Professor Zhou has primary research interests in the areas of survival analysis and analysis of correlated responses, with particular focus on competing risks survival data. Her current work involves regression modeling of cumulative incidence for competing risks data, common in cancer clinical trials. She has applied this research to the incidence of deficient blood platelet counts for a cancer drug currently in clinical development at a major pharmaceutical company. Her collaborative research has involved cancer prevention and treatment, pulmonary diseases, and otolaryngologic disease. Ph.D. University of North Carolina at Chapel Hill

Yong Zhu Associate Professor, Department of Environmental Health Sciences. Professor Zhu's research interests focus on using a molecular epidemiological approach to study genetic susceptibility markers and their interactions with environmental exposure in

human disease development. He has been developing and validating novel phenotypic and genotypic assays and biomarkers for several smoking-related cancers. By utilizing various techniques in molecular biology, molecular cytogenetics, cell biology, and computational biology, he identifies biomarkers that can characterize inherited genetic predisposition and cellular response to environmental factors. In addition, Professor Zhu is interested in applying evolutionary concepts and tools in biomarker study and medical research. He is currently using phylogenetic analysis to screen biomarkers for molecular epidemiological study and addressing the role of gene-environment interaction in human disease in the context of human evolutionary history. Ph.D. Rice University

History of the Yale School of Public Health

The Yale School of Public Health is one of the oldest nationally accredited schools of public health in the country. It was one of the eight existing schools first accredited by the American Public Health Association in 1946, though its origins date back three decades earlier as a department in the Yale School of Medicine, a status it maintains today.

In 1914 Yale University received an endowment from the Anna M. R. Lauder family to establish a chair in public health in the School of Medicine. This chair was filled in 1915 by Charles-Edward Amory Winslow, who was to be a central figure in the development of public health at Yale for thirty years. In 1920 Winslow set forth a definition of public health:

Public health is the science and the art of preventing disease, prolonging life and promoting physical health and efficiency through organized community efforts for the sanitation of the environment, the control of community infections, the education of the individual in principles and personal hygiene, the organization of medical and nursing services for the early diagnosis and preventive treatment of disease, and the development of the social machinery which will ensure to every individual a standard of living adequate for the maintenance of health; organizing these benefits in such a fashion as to enable every citizen to realize his birthright of health and longevity.

In the early 1920s Winslow's Department of Public Health at Yale was a catalyst for public health reform in Connecticut, and his health surveys – prepared in collaboration with other members of the faculty and students – led to considerable improvements in public health organization across the country. He also successfully campaigned to improve health laws in Connecticut and for the passage of a bill that created the State Department of Public Health.

Winslow focused on “the education of undergraduate medical students along the lines of preventive medicine.” He also established a one-year program leading to a Certificate in Public Health, which later became the Master of Public Health degree. From the beginning, Winslow sought to build bridges between the Department of Public Health, the Sheffield Scientific School, and the Graduate School of Arts and Sciences by making courses available to students in the other schools. He was also able to establish Bacteriology, Pathology, and Public Health as a single, unified department in the Graduate School.

Winslow looked to a number of existing departments (Bacteriology, Immunology, Medicine, Pathology, Pediatrics, Physiological Chemistry, Sanitary Engineering, and Zoology) to supplement his own courses in public health principles, public health administration, and vital statistics. He established a comprehensive nonmedical program that by 1925 graduated eighteen students with a Certificate in Public Health, ten with a Ph.D., and four with a Dr.P.H. Students specialized in administration, bacteriology, or statistics.

During Winslow's thirty years at Yale, hygiene developed into preventive medicine; bacteriology evolved into microbiology to include parasitology and virology; classic epidemiology evolved into clinical epidemiology; control of communicable diseases became chronic disease control; and public health assimilated the social dimensions of sickness

and health and appropriated such disciplines as medical economics and medical care organization. It was due to Winslow's innovative foresight and commitment to interdisciplinary education that the department's academic programs earned recognition as a nationally accredited School of Public Health in 1946.

In the early 1960s, the Yale Department of Public Health merged with the Section of Epidemiology and Preventive Medicine, a unit within the Department of Internal Medicine. In 1964 the new department moved into its own building, the Laboratory of Epidemiology and Public Health (LEPH), which was designed by Philip Johnson and continues as its primary location for research and teaching.

Concurrent with the move into LEPH, the Rockefeller Foundation bequeathed its arbovirus research unit, including its scientists and research staff, to Yale. The arrival of virologists Wilbur Downs, Nobel Prize winner Max Theiler, Jordi Casals, Sonja Buckley, and others began a rapid expansion of public health at Yale. Their groundbreaking work on tropical diseases set the stage for a division of international health that focused on basic health care and delivery in underserved populations.

Meanwhile, as public health successes in infectious disease control (polio, measles, etc.) were changing medical demands nationally, the School also broadened its focus to address the growing burden of chronic diseases such as cardiovascular disease, cancer, and issues surrounding aging. During these years, the Master of Public Health curriculum was also reorganized into four divisions (biostatistics, epidemiology, hospital administration, and environmental health).

In the late 1960s and early 1970s, health policy and the psychosocial and behavioral determinants of health gained focus as academic specialties. Today, faculty and students also bring expertise in genomics, mathematical modeling, behavioral economics, and innovative technologies to the field, the bench, and the classroom to address evolving public health challenges and advance health promotion in the era of globalization.

A century after Winslow's appointment, Public Health continues to strengthen its interdisciplinary research partnerships with numerous entities at the School of Medicine and across Yale's campus. In its dual capacity as a nationally accredited School of Public Health and a school within the Yale School of Medicine, it honors Winslow's commitment to public health education across disciplines and community practice through an array of degrees offered to a wide audience, ranging from undergraduates to advanced professionals, in conjunction with Yale College, the Graduate School, and six of Yale's professional schools.

Master of Public Health

Yale's Master of Public Health (M.P.H.) degree program is designed for highly motivated students with related work experience or a professional degree as well as a substantial interest in an area of public health. A unique sequencing of courses, community-based programmatic activities, and field or laboratory research provides students with multiple opportunities to define their specialty and tailor their course of study.

Individualized programs are shaped by frequent interactions with faculty through courses, field experiences, and the thesis. An important component of the M.P.H. program is the faculty-student relationship, institutionalized in the form of an advisory system. Students are expected to work with their adviser in selecting appropriate courses, deciding on their internship and thesis, and integrating learning from all their experiences.

M.P.H. students focus their studies in one of the following departments: Biostatistics, Chronic Disease Epidemiology, Epidemiology of Microbial Diseases, Environmental Health Sciences, or Health Policy and Management. In addition, students may focus their studies in programs in the Social and Behavioral Sciences division and in the Health Policy Program (HP) or the Health Care Management Program (HCM). Students select their department/division/program at the time of application.

The Advanced Professional M.P.H. Program is available for individuals with doctoral-level degrees in a field related to public health and for medical students. Students in the AP Program apply to one of six tracks: Applied Biostatistics and Epidemiology; Health Policy; Social and Behavioral Sciences; Global Health; Preventive Medicine; and Occupational and Environmental Medicine.

The B.A.-B.S./M.P.H. Select Program gives Yale College students interested in the field of public health the opportunity to earn a bachelor's degree from Yale College and an M.P.H. degree from the Yale School of Public Health in a five-year joint-degree program.

The Accelerated M.B.A./M.P.H. Program in Health Care Management enables students to earn an M.B.A. degree from the Yale School of Management and an M.P.H. degree from the Yale School of Public Health in a twenty-two-month integrated program.

The Global Health Concentration emphasizes a multidisciplinary, problem-solving approach to global health issues that encourages creativity and innovation while fostering a global perspective. Students in the Global Health Concentration may complete this concentration while they satisfy the requirements of their respective department/division/program. Successful completion of the concentration will be recorded on the student's transcript when he or she graduates.

The Regulatory Affairs Track prepares students for future roles in the area of quality control and regulatory affairs. This track operates within the existing YSPH academic structure and will be recorded on the student's transcript when he or she graduates if all track requirements have been met. Students complete all of the core and departmental requirements as well as the required courses for the track.

All M.P.H. students are urged to develop programs of study that include courses from other departments within YSPH and throughout the University in order to benefit from

the strengths of Yale's professional and graduate schools and learn ways to understand the complexity and multidimensionality of most public health issues.

Students in the traditional two-year M.P.H. program are required to complete 20 course units, which include the core curriculum, departmental/divisional/program requirements, and electives both within YSPH and in other schools at the University (with the permission of the academic adviser). Course units are not given for seminars and colloquia.

Full-time students must carry a minimum of 4 course units per term for four terms and must complete all course requirements (including the thesis) within five years of matriculation. A thesis is not required for students in Health Policy or Health Care Management.

Part-time student status is granted to those students taking fewer than 4 course units per term. Part-time students are encouraged to take at least 2 course units per term and must complete all course requirements (including the thesis) within five years of matriculation.

CORE CURRICULUM FOR THE TRADITIONAL TWO-YEAR M.P.H. DEGREE PROGRAM

<i>Course number</i>	<i>Course title</i>	<i>Course units</i>
BIS 505a	Introduction to Statistical Thinking I	1
BIS 505b	Introduction to Statistical Thinking II (not required for HP or HCM)	1
CDE/EMD 508a	Principles of Epidemiology I	1
*CDE 505a	Social and Behavioral Foundations of Health	1
EPH 100a	Professional Skills Seminar	n/a
EPH 515a	Ethics and Public Health: An Introduction	n/a
EPH 520c	Summer Internship	n/a
EPH 525b	Thesis (not required for HP or HCM)	2
One of the following:		
EHS 503a	Principles of Toxicology	1
EHS 510a	Principles of Environmental Health	1
One of the following:		
HPM 510a	Introduction to Health Policy and Health Systems	1
HPM 560b	Health Economics and U.S. Health Policy	1
Students in HCM only:		
†MGT/HPM 698b	Health Care Policy, Finance, and Economics	1

*Students in SBS, HP, and HCM should take CDE 537b, Social and Interpersonal Influences on Health, instead of CDE 505a.

†This course offered in the School of Management.

Public Health Practice requirement All students in the M.P.H. program are required to complete a Public Health Practice experience. YSPH Public Health Practice requirement guidelines are outlined in Appendix I. There are four options for satisfying this requirement:

EPH 500b	Public Health Practicum	1
*EPH 520c	Summer Internship	n/a
EPH 542b	Practice-Based Community Health Research	1
HPM 555a or b	Health Policy and Health Care Management Practicum	1

*With the exception of those in the Advanced Professional M.P.H. program, all M.P.H. students *must* complete a 10–12-week summer internship. The summer internship may be used to complete the practice requirement for the M.P.H. degree with prior approval from the Office of Public Health Practice.

Competencies of the Core Curriculum

Upon completing the core curriculum of the M.P.H. program, the student will be able to:

- Demonstrate a knowledge base in the disciplines of biostatistics, chronic and infectious disease epidemiology, health systems, public policy, social and behavioral sciences, and environmental health.
- Apply basic research skills to specific public health problems in both group and individual settings, including the ability to define problems; construct, articulate, and test hypotheses; draw conclusions; and communicate findings to a variety of audiences.
- Explain the interrelationships among a multitude of factors that can impact a public health problem, including scientific, medical, environmental, cultural, social, behavioral, economic, political, and ethical factors.
- Review, critique, and evaluate public health reports and research articles.
- Apply public health concepts, principles, and methodologies obtained through formal course work to actual problems experienced in the community or work environment.
- Critically evaluate programs, interventions, and outcomes that relate to public health practice.
- Apply ethical standards and professional values as they relate to the practice of public health.
- Demonstrate sensitivity to the social context within which public health professionals practice.

M.P.H. DEPARTMENTS, DIVISIONS, PROGRAMS, TRACKS, AND CONCENTRATIONS

Biostatistics Department

Hongyu Zhao, Ph.D., Chair

Biostatistics is a scientific discipline that focuses on developing new statistical methodology and theory to address important questions in the biological and health sciences, including study designs, data collection and analysis, as well as result interpretation. In addition to independent methodological and theoretical developments, the faculty in the Department of Biostatistics are involved in a wide variety of collaborative research efforts throughout the University, including at the School of Public Health and the School of Medicine. We bring these innovations into practice through active participation in many

disciplines at Yale and beyond. In addition to course work, students gain real-world experiences through intern opportunities and a master's thesis. Our students are well prepared for positions in public/governmental and nonprofit agencies, medical centers, and various industries, as well as for doctoral studies in biostatistics and related fields.

DEPARTMENTAL REQUIREMENTS FOR THE M.P.H. IN BIOSTATISTICS

<i>Course number</i>	<i>Course title</i>	<i>Course units</i>
BIS 525a and b	Seminar in Biostatistics	n/a
BIS 540a	Fundamentals of Clinical Trials	1
BIS 623a	Applied Regression Analysis	1
BIS 625a	Categorical Data Analysis	1
BIS 628b	Longitudinal and Multilevel Data Analysis	1
BIS 630b	Applied Survival Analysis	1
*STAT 541a	Probability Theory	1
*STAT 542b	Theory of Statistics	1
EPH 525b	Thesis	2

*These courses are offered in the Graduate School of Arts and Sciences.

COMPETENCIES FOR THE M.P.H. IN BIOSTATISTICS

Upon receiving an M.P.H. with a concentration in Biostatistics, the student will be able to:

- Describe concepts of probability, random variation, and commonly used statistical probability distributions.
- Develop an efficient design for collecting, recording, and storing data collected in the conduct of public health and medical research.
- Develop sample size and statistical power calculations for basic study designs including those utilized in clinical trials.
- Design efficient computer programs for study management, statistical analysis, as well as presentations using SAS and other programming languages.
- Produce edited data sets suitable for statistical analyses.
- Apply informatics techniques with vital statistics and public health records in the description of public health characteristics and in public health research and evaluation.
- Perform analyses of stated hypotheses using a variety of analytical tools including analysis of variance, multiple regression, nonparametric statistics, logistic regression, multivariate analyses, and methods for analyzing rates and failure time data.
- Interpret results of statistical analyses and use these results to make relevant inferences from data.
- Produce working tables and statistical summaries describing research in health science.
- Develop written presentations based on statistical analyses for both public health professionals and educated lay audiences.
- Develop oral presentations based on statistical analyses for both public health professionals and educated lay audiences.

Regulatory Affairs Track

Robert W. Makuch, Ph.D., Professor of Biostatistics, Director

Every drug, medical device, diagnostic test, and food sold in the United States must meet rigorous standards that are intended to insure that all products satisfy a set of safety and performance objectives. Scientists must possess the knowledge and expertise to create and implement high-quality systems as well as understand the environment encompassing regulatory compliance. Other essential skills include project management and leadership, scientific tools that allow for proper risk assessment and risk management strategies, and the ability to clearly communicate the regulatory decisions made.

The Regulatory Affairs Track is an interdisciplinary program that may be combined with any departmental concentration. Four courses are required. The track covers a wide array of regulatory affairs topics, including complex issues involving food and drug law, ethics, clinical trials, epidemiology, risk analysis, and leadership and change management.

The Regulatory Affairs Track is directed by Professor Robert Makuch, who has extensive experience working with pharmaceutical companies and government agencies on regulatory affairs issues.

REQUIREMENTS FOR THE M.P.H. IN THE REGULATORY AFFAIRS TRACK

<i>Course number</i>	<i>Course title</i>	<i>Course units</i>
BIS 540a	Fundamentals of Clinical Trials	1
BIS 575b	Introduction to Regulatory Affairs	1
Two of the following:		
BIS 561b	Advanced Topics and Case Studies in Multicenter Clinical Trials	1
CDE 650a	Introduction to Evidence-Based Medicine and Health Care	1
EHS 511b	Applied Risk Assessment	1
HPM 570a	Cost-Effectiveness Analysis and Decision Making	1

COMPETENCIES FOR THE REGULATORY AFFAIRS TRACK

Upon completion of the track, the student will be able to:

- Utilize the best scientific and ethical standards to insure that food, pharmaceutical, and medical and diagnostic devices meet quality and regulatory standards.
- Develop/use leadership and management skills for conducting/overseeing research and clinical studies that are required by regulatory agencies.
- Develop processes that insure clear and consistent decisions to the public and to regulatory agencies.
- Assess/develop risk management strategies that can be used to get new products to the market swiftly, while assuring the consumer and regulatory bodies that efficacy and safety have been preserved.

Chronic Disease Epidemiology Department

Judith H. Lichtman, M.P.H., Ph.D., Chair

Epidemiology is the study of the frequency, distribution, and causes of diseases in human populations. Chronic Disease Epidemiology (CDE) aims to enhance understanding about the determinants of chronic diseases in populations and how to intervene most effectively to reduce morbidity and mortality due to chronic diseases. CDE strives to advance public health by promoting a research-based approach to the prevention and management of chronic disease. By focusing on the health of populations, as opposed to individuals, CDE utilizes places (neighborhoods, cities, states, countries), institutions (schools, housing developments, correctional facilities, workplaces), and health care facilities (newborn nurseries, nursing homes, public health clinics, hospitals) as its laboratories.

CDE students learn how to identify the types of data needed, choose appropriate data collection methods, collect the data, and analyze the data appropriately so that the whole research effort leads to the improvement of the health of populations. The CDE curriculum emphasizes critical thinking, based on thorough knowledge of research methods, and its application to the scientific literature, to the development of research protocols, and to the design, implementation, and analysis of epidemiologic investigations. A principal research instrument of the chronic disease epidemiologist is often the questionnaire. The development of valid, reliable, and unambiguous questionnaires is a skill taught to all CDE students. Increasingly, epidemiologists also make use of genetic and biologic markers to indicate exposure to potentially damaging agents or as signs of increased susceptibility to or early onset of disease. Students learn the role of these methodologies throughout the program through course work, seminars, and practicum experiences.

Students learn about the role of epidemiology in a broad range of public health and medical areas, including the fields of aging, cancer, cardiovascular disease, global health, molecular and genetic epidemiology, perinatal and reproductive epidemiology, and psychosocial epidemiology, all areas in which the CDE department has particular strength. Among the resources available to students are the Yale Cancer Center; the Connecticut Tumor Registry (the oldest of its kind in the world); the Center for Perinatal, Pediatric, and Environmental Epidemiology; the Yale Program on Aging; and the Center for Interdisciplinary Research on AIDS. M.P.H. graduates of the CDE department find employment in a variety of research, public health practice, and advocacy settings, including academic institutions; public health agencies at the international, national, state, and local levels; the pharmaceutical industry; charitable foundations; and a variety of other nonprofit organizations. For example, graduates may obtain positions in such federal agencies as the National Institutes of Health (NIH) or the Centers for Disease Control and Prevention (CDC). Nonprofit agencies, such as cancer or heart associations, also recruit graduates to participate in or direct community health programs. Private industries, including pharmaceutical companies, find the quantitative skills of CDE graduates useful in monitoring drug safety and in conducting clinical research. Many CDE graduates subsequently pursue doctoral degrees in public health or other professional or academic fields.

DEPARTMENTAL REQUIREMENTS FOR THE M.P.H.
IN CHRONIC DISEASE EPIDEMIOLOGY

Course number	Course title	Course units
*CDE 516b	Principles of Epidemiology II	1
CDE 523b	Measurement Issues in Chronic Disease Epidemiology	1
CDE 525a and b	Seminar in Chronic Disease Epidemiology/Social and Behavioral Sciences	n/a
*CDE 534b	Applied Analytic Methods in Epidemiology	1
EPH 525	Thesis	2
*Must be completed in the first year.		1
One of the following:		
BIS 538b	Survey Sampling: Methods and Management	1
BIS 540a	Fundamentals of Clinical Trials	1
BIS 623a	Applied Regression Analysis	1
BIS 625a	Categorical Data Analysis	1
BIS 626a	Gerontologic Biostatistics: Statistical Methods for Clinical Research with Older Study Participants and for Basic Aging Research	1
BIS 628b	Longitudinal and Multilevel Data Analysis	1
BIS 630b	Applied Survival Analysis	1
One of the following:		
CDE/EHS 502b	Physiology for Public Health	1
CDE 532b	Epidemiology of Cancer	1
CDE 535b	Epidemiology of Heart Disease and Stroke	1
CDE 562a	Nutrition and Chronic Disease	1

Chronic Disease Epidemiology students are advised to take *two* additional CDE elective courses.

COMPETENCIES FOR THE M.P.H.
IN CHRONIC DISEASE EPIDEMIOLOGY

Upon receiving an M.P.H. with a concentration in Chronic Disease Epidemiology, the student will be able to:

- Evaluate the scientific merit and feasibility of epidemiologic study designs.
- Describe the epidemiology of common chronic diseases with more in-depth knowledge of a specialty area.
- Apply basic principles of health promotion and disease prevention to prevent and control chronic diseases.
- Synthesize information from a variety of epidemiologic and related studies.
- Design and carry out epidemiologic studies at an intermediate level.
- Analyze data and draw appropriate inferences from epidemiologic studies at an intermediate level.

- Demonstrate oral and written communication and presentation skills to effectively communicate and disseminate results to various professional and community audiences.
- Describe basic pathophysiology of selected chronic diseases.
- Identify, interpret, and use routinely collected data on disease occurrence.
- Review, critique and evaluate epidemiologic reports and research articles at an intermediate level.

Social and Behavioral Sciences Division

Trace S. Kershaw, Ph.D., Division Head

The overall purpose of the Social and Behavioral Sciences (SBS) division, within the CDE department, is to provide instruction in the theory and methods of the social and behavioral sciences that emphasize the social, psychological, and behavioral influences on health, illness, and recovery. The primary emphases are focused on (1) understanding the psychosocial, behavioral, community, and societal influences on health in the general population, including those who are disadvantaged; and (2) creating multilevel interventions that eliminate barriers to health, from infancy to old age.

The SBS curriculum takes an interdisciplinary approach and combines courses in social and behavioral sciences and epidemiology. SBS students will take courses in epidemiologic methods and biostatistics as well as courses in SBS-related methods and practical and advanced skills for the development and implementation of interventions in health promotion and disease prevention. In addition, SBS students will conduct a thesis that draws on a topic and methods related to the social and behavioral sciences.

DIVISIONAL REQUIREMENTS FOR THE M.P.H. IN SOCIAL AND BEHAVIORAL SCIENCES

<i>Course number</i>	<i>Course title</i>	<i>Course units</i>
CDE 516b	Principles of Epidemiology II	1
CDE 525a and b	Seminar in Chronic Disease Epidemiology and Social and Behavioral Sciences	n/a
CDE 534b	Applied Analytic Methods in Epidemiology	1
CDE 537b	Social and Interpersonal Influences on Health	1
CDE 574b	Developing a Health Promotion and Disease Prevention Intervention	1
EPH 525	Thesis	2

One of the following:

CDE 580b	Qualitative Research Methods	1
CDE 676b	Questionnaire Development	1

One of the following is required, and an additional one is recommended:

CDE 531a	Health and Aging	1
CDE 545b	Health Disparities by Race and Social Class	1
CDE 568b	Public Health Communications	1
CDE 572a	Obesity Prevention and Lifestyle Interventions	1

CDE 573a	Social and Cultural Factors in Mental Health and Illness	1
CDE 581a	Stigma and Health	1
CDE 585a	Sexuality, Health, and Human Rights	1
CDE 594a	Maternal-Child Public Health Nutrition	1
CDE 596b	Global Health Justice Practicum	1
HPM 545b	Health Disparities	1

Any course in social and behavioral sciences from across the University at level 300 or above, with approval of course instructor and YSPH faculty adviser.

COMPETENCIES FOR THE M.P.H. IN SOCIAL AND BEHAVIORAL SCIENCES

Upon receiving an M.P.H. with a concentration in Social and Behavioral Sciences, the student will be able to:

- Identify the effects of social, psychological, and behavioral factors on individual and population health, including prevention, treatment, and management of chronic disease, adjustment to illness, adherence to treatment regimens, and promotion of recovery.
- Analyze health from multiple levels, including the individual, social group, community, and society.
- Critically evaluate and interpret the public health scientific literature as presented in professional journals and the popular media, including descriptive, analytic, and intervention studies.
- Construct research hypotheses and design a study to test these hypotheses.
- Describe how culture, social inequities, and biology influence health across the life span.
- Apply social, psychological, and behavioral theory in the design, implementation, and evaluation of prevention interventions aimed toward: (a) reducing psychological risk factors (e.g., racism); (b) increasing psychosocial well-being (e.g., coping with chronic illness); (c) increasing health-promoting behaviors (e.g., exercise); and (d) decreasing health-damaging behaviors (e.g., risky sex).
- Develop procedures and training materials to implement effective behavioral interventions.
- Identify ways to address health inequalities and promote health equity.
- Describe the appropriate statistical analyses to examine different types of research questions in the social and behavioral sciences.
- Demonstrate oral and written communication and presentation skills to effectively communicate and disseminate results to various professional and community audiences.
- Explain the dynamic interaction between policies and the social and behavioral sciences.
- Apply ethical principles involved in social and behavioral sciences as they relate to public health.

Environmental Health Sciences Department

Vasilis Vasiliou, Ph.D., Chair

Human beings are exposed to a wide range of biological, chemical, and physical environmental stressors during their daily activities (i.e., work, eating, drinking, hobbies) in a variety of places (i.e., residences, industrial and nonindustrial workplaces, automobiles, outdoors). Exposures to some of these stressors can increase the risks of many diseases.

The Department of Environmental Health Sciences (EHS) seeks to train students to recognize and assess the impact of environmental hazards on human health in the community and occupational settings and to identify a range of solutions to reduce exposures to those hazards and prevent diseases in the population.

Students in EHS can choose tracks in Environmental Epidemiology, Environmental Policy, or Risk Assessment. Within these tracks there is flexibility for students to design, with their adviser, a program to meet individual needs. Students take advantage of the wide variety of courses relevant to environmental health offered by the department and throughout the University, particularly those in the School of Forestry & Environmental Studies.

M.P.H. graduates of the EHS department find employment in public agencies at the community, city, state, and federal levels; in pharmaceutical companies; in areas such as risk assessment and occupational health and safety; in environmental consulting organizations; and in private sector companies in the area of corporate health and safety. They also take research positions in organizations including the National Institutes of Health, the Centers for Disease Control, and the Environmental Protection Agency. In addition, many students go on to pursue their Ph.D. and independent research careers.

DEPARTMENTAL REQUIREMENTS FOR THE M.P.H. IN ENVIRONMENTAL HEALTH SCIENCES

<i>Course number</i>	<i>Course title</i>	<i>Course units</i>
CDE 516b	Principles of Epidemiology II	1
CDE 534b	Applied Analytic Methods in Epidemiology	1
EHS/CDE 502b	Physiology for Public Health	1
EHS 503a	Principles of Toxicology	1
EHS 507a	Environmental Epidemiology	1
EHS 508b	Assessing Exposures to Environmental Stressors	1
EHS 510a	Principles of Environmental Health	1
EHS 511b	Applied Risk Assessment	1
EHS 525a and b	Seminar and Journal Club in Environmental Health	n/a
EPH 525b	Thesis	2

COMPETENCIES FOR THE M.P.H. IN ENVIRONMENTAL HEALTH SCIENCES

Upon receiving an M.P.H. with a concentration in Environmental Health Sciences, the student will be able to:

- Discuss the basic principles of how contaminants are introduced into the air, water, soil, and food and then transported through the environment.

- Describe the mechanisms of toxicity of biological, chemical, and physical stressors, including absorption, distribution, metabolic transformation, elimination, and genetic susceptibility.
- Use epidemiological, toxicological, statistical, and exposure assessment techniques in assessing the risks associated with environmental hazards in the working, residential, and community environments.
- Apply the basic principles used to manage risks associated with exposure to environmental hazards.
- Review, critique, and evaluate environmental epidemiology research articles.
- Evaluate the scientific merit and feasibility of environmental epidemiology study designs.
- Synthesize information from a variety of environmental health and related studies.
- Coordinate an environmental epidemiology study, with minimal supervision.
- Write up and present research findings to professional audiences.

Epidemiology of Microbial Diseases Department

Albert I. Ko, M.D., Chair

Microbial disease epidemiology is the science of the cause, distribution, frequency of, and resistance to infections caused by viruses, parasites, and bacteria, and of the distribution, transmission, and control of these agents.

The M.P.H. curriculum for the Department of Epidemiology of Microbial Diseases (EMD) is designed to train the student to understand the epidemiology of the major infectious agents, the diseases they cause, and the host response to those diseases. The interaction of the agent (parasite, bacterium, or virus) with the host and the influence of the environment on both agent and host are studied. The curriculum considers the role of age, immunological response, genetics, natural history of vectors, geographical distribution, and transmission and transport of agents. In addition to epidemiology courses, the department's faculty teach microbiology courses relating to bacteria, viruses, and parasites – including classification, replication, biochemistry, genetics, immunology, and pathogenesis – essential to the understanding of the epidemiology of microbial disease. Through these experiences the student gains a clear understanding of the quantitative and qualitative biological spectrum of microbial diseases.

Using a problem-solving approach the student learns about surveillance through collection and analysis of data followed by synthesis of information as a basis for public health decisions. The same approach is used to investigate epidemics and to study basic biologic problems.

Emphasis is placed on the application of epidemiological concepts to intervention in transmission cycles and disease progression. Intervention may be accomplished through such measures as vaccination, antimicrobial therapy, vector control, or behavior modification. The student is encouraged to obtain a solid laboratory foundation for diagnosis, for population-based serologic surveys, and for understanding the molecular basis of the disease process and intervention strategies. Third World infectious disease problems and their solutions are considered extensively.

Nearly half of EMD graduates in the M.P.H. program enter public health practice at the local, state, or national level, and a portion of the remainder enter hospital, medical center, or industrial programs. Many students continue graduate and professional education beyond the M.P.H. degree.

**DEPARTMENTAL REQUIREMENTS FOR THE M.P.H.
IN EPIDEMIOLOGY OF MICROBIAL DISEASES**

<i>Course number</i>	<i>Course title</i>	<i>Course units</i>
EMD 512a	Immunology for Epidemiologists	1
EMD 518a and b	Principles of Infectious Diseases I and II	2
EMD 525a and b	Seminar in Epidemiology of Microbial Diseases	n/a
EPH 525b	Thesis	2

One of the following:

CDE 516b	Principles of Epidemiology II	1
CDE 534b	Applied Analytic Methods in Epidemiology	1

Students are required to choose at least two additional EMD courses in collaboration with their adviser.

**COMPETENCIES FOR THE M.P.H.
IN EPIDEMIOLOGY OF MICROBIAL DISEASES**

Upon receiving an M.P.H. with a concentration in Epidemiology of Microbial Diseases, the student will be able to:

- Define the scope and worldwide impact of infectious diseases.
- Describe the processes that drive transmission and maintenance of infectious agents.
- Describe the epidemiology of the major infectious diseases worldwide, as well as risk exposures and behaviors as these relate to transmission.
- Describe the host genetic and immunologic factors that affect transmission and disease progression.
- Describe pathogen-related determinants that contribute to transmission and disease.
- Explain the interrelationship between the environment and the emergence and maintenance of infectious diseases in populations.
- Describe and critically evaluate approaches for the prevention and control of infectious diseases and define the issues that are key to their effective use.
- Apply principles and concepts obtained through course work to design and implement studies on the etiology, detection, prevention, or control of infectious diseases in the laboratory and field.
- Define the ethical challenges in infectious disease research.

Health Policy and Management Department

A. David Paltiel, Ph.D., Chair

The goal of the Department of Health Policy and Management (HPM) is to address the critical issues in improving public health, especially the health of high-risk and vulnerable populations. The department offers two M.P.H. programs: Health Policy and Health Care Management.

Health Policy Program

A. David Paltiel, Ph.D., Interim Director

The specific objectives of the Health Policy program are: (1) to provide its students with a basic foundation of knowledge in public health and health policy, and (2) to teach concepts, principles, and scientific skills necessary for health services policy development and evaluation and health management. The Health Policy program – within the Department of Health Policy and Management – aims to have students develop an understanding of the importance of data and research as policy and management tools. Students are taught to anticipate future needs relative to expanding technology, changing patterns of community health, and emerging societal and programmatic needs.

The program provides a unified approach to policy. It is built on the recognition that issues of health policy cannot be divorced from principles of sound management, nor can health care management or policy be developed without a fundamental understanding of morbidity, mortality, and epidemiologic methods. Further, the program recognizes that leaders cannot make successful decisions about the delivery of health care nor solve the health problems affecting society over the next decades without extensive analytic and decision-making skills. Students need to be able to translate sound scientific evidence into effective health policy. The program emphasizes training in quantitative methods, economics, financing, epidemiology, and evaluative methods for policy and management. Social and behavioral sciences are integral parts of many courses throughout the two-year curriculum.

Students design their own sequence of courses in health policy, and they may also specialize in particular substantive areas (e.g., addiction, health economics, vulnerable populations, global health, or consumer decision making). Students are required to take an integrative seminar in health policy.

Graduates of the program in Health Policy are employed in both the public and private sectors, including federal and state agencies, for-profit and nonprofit health care organizations, hospitals, and private consulting firms, as well as in research.

DEPARTMENTAL REQUIREMENTS FOR THE M.P.H. IN HEALTH POLICY

<i>Course number</i>	<i>Course title</i>	<i>Course units</i>
HPM 510a	Introduction to Health Policy and Health Systems	1
HPM 514b	Health Politics, Governance, and Policy	1
HPM 560b	Health Economics and U.S. Health Policy	1
HPM 570a	Cost-Effectiveness Analysis and Decision Making	1
HPM 583b	Methods in Health Services Research	1
HPM 586a	Microeconomics for Health Policy and Health Management	1
HPM 597b	Capstone Course in Health Policy	1

The thesis and BIS 505b, Introduction to Statistical Thinking II, are not required in HPM.

COMPETENCIES FOR THE M.P.H. IN HEALTH POLICY

Upon receiving an M.P.H. with a concentration in Health Policy, the student will be able to:

- Evaluate the efficiency of public policies using economic concepts.
- Identify market failures in the market for public health activities and health care.
- Conduct decision analysis to evaluate prevention, screening, and treatment alternatives in public health and clinical medicine.
- Critically evaluate both the methods and application of cost-effectiveness analysis to inform public health decision making.
- Assess statistical findings and empirical literature to enhance policy design and implementation.
- Synthesize the research literature, assessing strengths and weaknesses of published findings, to guide evidence-informed policy making.
- Describe and assess the historical evolution of how different countries' systems for financing and delivering health care have evolved and influenced the health of their populations.
- Describe the role of the major U.S. political institutions in health policy and politics.
- Identify and evaluate different strategies for financing, regulatory, and delivery system reform.
- Influence health policy and management decision making.
- Understand strategies of media advocacy to effectively reshape public awareness and opinion on health-related issues.
- Describe conceptual frameworks for political agenda setting.
- Assess how well different governance arrangements and policy designs result in a health care system that is responsive to differences in health needs among subsets of the population.
- Describe legal perspectives and institutions that affect health policy and public health, including assessment of legal and regulatory environments in the context of public health.
- Understand the ethical distinctions and professional norms associated with different paradigms for policy analysis and their implications for health policy.
- Demonstrate written communication skills to effectively communicate in professional health policy and community settings.
- Demonstrate oral communication and presentation skills to effectively communicate in professional health policy and community settings.
- Demonstrate leadership, team-based collaboration, and management skills.

Health Care Management Program

Howard Forman, M.D., Director

Future health care managers will be involved in a wide range of settings, including hospitals, health systems, pharmaceutical and biotechnology companies, health maintenance organizations, managed care companies, insurance companies, and consulting. The Health Care Management program – within the Department of Health Policy and Management – was designed with the realization that both management training and

public health training are needed to adequately prepare future leaders in health care management. The program is offered in conjunction with the Yale School of Management (SOM). The management courses at SOM, combined with HPM offerings and an integrative course in the second year, give students an excellent foundation for work in the field.

DEPARTMENTAL REQUIREMENTS FOR THE M.P.H. IN HEALTH CARE MANAGEMENT

First-year students

<i>Course number</i>	<i>Course title</i>	<i>Course units</i>
HPM 561b	Managing Health Care Organizations	1
HPM 583b	Methods in Health Services Research	1
HPM 586a	Microeconomics for Health Policy and Health Management	1
HPM 699a and b	Colloquium in Health Care Leadership	0.5
*MGT 502a	Fundamentals of Accounting and Finance	1
*MGT 525a	Competitive Strategy	1
*MGT 621a	Managing Social Enterprises	1
*MGT 657b	Creating Health Care and Life Science Ventures	0.5
*MGT/HPM 698b	Health Care Policy, Finance, and Economics	1
*MGT 856b	Managing Marketing Programs (half-term)	0.5
*MGT 879b	Health Care Operations (half-term)	0.5
*MGT 887b	Negotiations: Beyond Win-Win (half-term)	0.5

*These courses are offered in the School of Management.

The thesis and BIS 505b, Introduction to Statistical Thinking II, are not required in HPM.

COMPETENCIES FOR THE M.P.H. IN HEALTH CARE MANAGEMENT

Upon receiving an M.P.H. with a concentration in Health Care Management, the student will be able to:

- Conduct financial analyses, including reading and analyzing financial statements.
- Conduct economic analyses, including cost-effectiveness analysis, to inform public health management decision making.
- Apply operations management concepts to address organizational performance issues in health service organizations.
- Apply the principles of marketing analysis and planning to public health programs and health service organizations.
- Utilize statistical analysis skills to conduct health systems and policy research.
- Utilize research design and data management skills to conduct health policy and management research.
- Evaluate health care financing, regulatory, and delivery systems.
- Demonstrate written communication skills to effectively communicate in professional health policy and community settings.
- Demonstrate oral communication and presentation skills to effectively communicate in professional health policy and community settings.

- Utilize advocacy, persuasion, and negotiation skills to influence health policy and management decision making.
- Perform strategic analysis and planning for public health care organizations.
- Describe legal perspectives on health policy and management issues, including assessment of legal and regulatory environments in the context of public health.
- Apply ethical decision making in a health care context.
- Apply management problem-solving skills to improve functioning of organizations and agencies in health systems.
- Demonstrate leadership, team-based collaboration, and conflict management skills.
- Coach and provide constructive feedback to colleagues.
- Work with and incorporate perspectives of culturally diverse groups.

Global Health Concentration

Rafael Pérez-Escamilla, Ph.D., Director

Students in the traditional two-year M.P.H. program may complete this concentration while they satisfy the requirements of their respective departments, divisions, or programs.

The multidisciplinary approach of the Global Health Concentration (GHC) encourages creativity and innovation, while fostering a global perspective on public health. The concentration emphasizes an integrative, problem-solving approach to global health issues and to diseases and conditions that afflict low- and middle-income countries. Students who complete this concentration will be well prepared for positions in a variety of sectors/organizations – public and private, national, bilateral and multilateral – dedicated to global health challenges.

All students in the GHC will complete four global health courses. Students will also participate in two terms of the Global Health Seminar (EPH 591a and b) during their first year and complete a global health internship in a low- to middle-income country during the summer between the first and second years of the M.P.H. program. If students have already had 10–12 weeks of previous global health experience, they can do an internship based in the United States or another high-income country as long as it is pertinent to global health; otherwise, they must do an internship abroad. This alternative option must be approved by the GHC office prior to the start of the internship. Students are strongly encouraged to write a global health-related thesis or participate in a relevant capstone experience (as determined by their department/division/program).

REQUIREMENTS FOR THE M.P.H. GLOBAL HEALTH CONCENTRATION

<i>Course number</i>	<i>Course title</i>	<i>Course units</i>
EPH 520c	Summer Internship (must be global health-related)	n/a
EPH 591a and b	Global Health Seminar (two terms, taken in the first year)	n/a
HPM 566b	Critical Issues in Global Health	1

Three global health courses selected from at least two of the five perspectives on public health*

3

*The five perspectives on public health are (1) biomedicine, (2) epidemiology, (3) psychosocial/social and behavioral/anthropology, (4) development/political economy, and (5) ethics/history/humanities. At the beginning of every term, a list of courses offered in each of the five areas will be available on the GHC Web site. Please note that all courses listed may not be offered each term.

Students pursuing the GHC may also propose courses not listed here as potential GHC electives. In this case, students must complete the required approval form, which is available on the GHC Web site. Requests must be approved before the YSPH course registration deadline. Upon receiving the form, the YSPH GHC program will let the student know if the course meets GHC elective requirements.

COMPETENCIES FOR THE M.P.H. GLOBAL HEALTH CONCENTRATION AND THE ADVANCED PROFESSIONAL M.P.H. PROGRAM GLOBAL HEALTH TRACK

Each student in the GHC will master the core curriculum competencies and the competencies for the student's department/division/program. In addition, upon receiving an M.P.H. degree in the GHC, the student will be able to:

- Describe the major causes of morbidity and mortality in the world, including an understanding of the global burden of disease.
- Describe cross-national determinants of health based on courses selected from the five perspectives on public health: biomedicine; epidemiology; psychosocial/social and behavioral/anthropology; development/political economy; and ethics/history/humanities.
- Analyze global health problems taking into account their social, political, economic, legal, and human rights dimensions.
- Understand and critically assess the different components of the global health governance infrastructure.
- Assess global health issues from an interdisciplinary perspective, including public health disciplines, medicine, international relations, environmental studies, political science, law, anthropology, and others.
- Apply necessary leadership skills to serve as bridges between the global health research and practice settings.
- Apply research methods in the design, monitoring, and evaluation of global health initiatives.
- Explain and propose solutions for the unique challenges involved in conducting public health research in low-resource settings.
- Describe and analyze different roles of global public health practitioners and apply this to individual career development.

B.A.-B.S./M.P.H. SELECT PROGRAM

The Select Program in Public Health gives Yale College students interested in the field of public health the opportunity to earn a bachelor's degree from Yale College and an M.P.H. degree from the Yale School of Public Health in a five-year joint program.

A total of 18 course units is required for the M.P.H. degree. Students in the B.A.-B.S./M.P.H. program affiliate with one of seven departments or programs at the School of Public Health. Their primary adviser comes from this department/program, and their

specific requirements within the five-year program are defined by this affiliation. Several course requirements can be taken while a senior at Yale College, with the remaining requirements satisfied during the one-year enrollment at the School of Public Health.

In their four years of Yale College enrollment, students complete a standard Yale College major, which consists of at least 36 course credits, 32 of which must be Yale College undergraduate approved courses credits. Two of those Yale College courses may be counted as electives toward the M.P.H. degree requirements. These electives must be on the School of Public Health's list of approved courses.

The remaining 4 course credits of the 36 required for a Yale College degree are typically taken at YSPH in order to fulfill the M.P.H. degree requirements. Students may take additional YSPH courses while at Yale College, as long as they complete the required 32 undergraduate courses.

Students accepted into the B.A.-B.S./M.P.H. program typically take four or more of the following YSPH courses during their senior year:

BIS 505a and b, Introduction to Statistical Thinking I and II

CDE 505a, Social and Behavioral Foundations of Health

CDE/EMD 508a, Principles of Epidemiology I

EPH 515a, Ethics and Public Health: An Introduction

EHS 503a, Principles of Toxicology

or

EHS 510a, Principles of Environmental Health

HPM 510a, Introduction to Health Policy and Health Systems

or

HPM 560b, Health Economics and U.S. Health Policy

Before beginning their fifth year at YSPH, students complete a public health internship during the summer between the fourth and fifth years of the B.A.-B.S./M.P.H. program. Information about the summer internship is available at <http://publichealth.yale.edu/internship>. Students are in full-time residence at the School of Public Health during their fifth year in the program, during which time they complete the remaining required courses and the master's thesis. Information on each department's degree requirements is available at <http://publichealth.yale.edu/admissions/programs/mph>.

Yale College students may apply to YSPH for the joint program in the fall term of their junior year. Candidates for admission must present evidence of a commitment to public health, as well as one year of college-level mathematics and either biology, chemistry, or physics. Applicants must complete YSPH application forms and submit transcripts, SAT scores, three letters of recommendation, and a personal statement.

Financial aid, if provided during the fifth year, will come from YSPH. The School cannot guarantee that the financial aid award in the fifth year will be equivalent to previous awards.

Further information about this program may be obtained from the Office of Student Affairs, 47 College St., Suite 108, New Haven CT 06510, 203.785.6260, or online at <http://publichealth.yale.edu/admissions/programs/select/index.aspx>.

ACCELERATED M.B.A./M.P.H. PROGRAM IN HEALTH CARE MANAGEMENT

The Accelerated M.B.A./M.P.H. Program in Health Care Management enables students to earn an M.B.A. degree from the Yale School of Management (SOM) and an M.P.H. degree from the Yale School of Public Health (YSPH) in a twenty-two-month integrated program. The program is designed to provide future health care leaders with the interdisciplinary training and perspective needed to address complex and multidimensional industry challenges.

Students begin the program with an intensive summer session at YSPH, where they complete M.P.H. core courses in Biostatistics, Epidemiology, and Social and Behavioral Sciences. The first year is spent at SOM, and students take courses at both schools during the final year.

Curriculum for the Accelerated M.B.A./M.P.H. in Health Care Management

In this program, students complete a total of 14 course units at YSPH and 33.5 course units at SOM.

YALE SCHOOL OF PUBLIC HEALTH

Core Requirements

<i>Course number</i>	<i>Course title</i>	<i>Course units</i>
BIS 515c	Accelerated Biostatistics	2
CDE 505c	Accelerated Social and Behavioral Foundations of Health	1
CDE 515c	Accelerated Epidemiology	1
EHS 510b	Principles of Environmental Health	1
EPH 100a	Professional Skills Seminar	n/a
EPH 515a	Ethics and Public Health: An Introduction	n/a
EPH 520c	Summer Internship (required whether or not used to fulfill the Public Health Practice Requirement)	n/a
HPM 698b	Health Care Policy, Finance, and Economics	1

Health Care Management Requirements

HPM 561b	Managing Health Care Organizations (Capstone)	1
HPM 570a	Cost-Effectiveness Analysis and Decision Making	1
HPM 583b	Methods in Health Services Research	1
HPM 699a and b	Colloquium in Health Care Leadership	0.5
Three electives at YSPH		3
One of the following:		
HPM 566b	Critical Issues in Global Health	1
HPM 592a	Strategic Thinking in Global Health	1

Public Health Practice Requirement

One of the following four:

EPH 500b	Public Health Practicum	1
EPH 520c	Summer Internship (approval required)	n/a
EPH 542b	Practice-Based Community Health Research	1
HPM 555a or b	Health Care Management Practicum	1

YALE SCHOOL OF MANAGEMENT**Core Requirements** (all half-term courses)

<i>Course number</i>	<i>Course title</i>	<i>Course units</i>
MGT 401a	Managing Groups and Teams	1
MGT 402a	Basics of Accounting	2
MGT 403a	Probability Modeling and Statistics	2
MGT 404a	Basics of Economics	2
MGT 406a	Problem Framing	2
MGT 407a	Careers	1
MGT 408a	Introduction to Negotiation	0.5
MGT 409a	Spreadsheet Modeling	1
MGT 410a	Competitor	2
MGT 411a	Customer	2
MGT 412a	Investor	2
MGT 413b	State and Society	2
MGT 414a	Leadership Fundamentals	1
MGT 415b	Advanced Leadership	1
MGT 420b	Employee	2
MGT 421b	Innovator	2
MGT 422b	Operations Engine	2
MGT 423a	Sourcing and Managing Funds	2
MGT 425b	The Global Macroeconomy	2
MGT 430b	Integrated Management Perspectives	2
MGT 432a	Leadership Practicum	n/a
International Experience (during spring break)		n/a

*Competencies for the Accelerated M.B.A./M.P.H.
in Health Care Management*

CORE CURRICULUM

Upon completing the core curriculum of the M.P.H. program, the student will be able to:

- Demonstrate a knowledge base in the disciplines of biostatistics, chronic and infectious disease epidemiology, health systems, public policy, social and behavioral sciences, and environmental health.
- Apply basic research skills to specific public health problems in both group and individual settings, including the ability to define problems; construct, articulate, and test hypotheses; draw conclusions; and communicate findings to a variety of audiences.

- Explain the interrelationships among a multitude of factors that can impact a public health problem, including scientific, medical, environmental, cultural, social, behavioral, economic, political, and ethical factors.
- Review, critique, and evaluate public health reports and research articles.
- Apply public health concepts, principles, and methodologies obtained through formal course work to actual problems experienced in the community or work environment.
- Critically evaluate programs, interventions, and outcomes that relate to public health practice.
- Apply ethical standards and professional values as they relate to the practice of public health.
- Demonstrate sensitivity to the social context within which public health professionals practice.

HEALTH CARE MANAGEMENT PROGRAM

Upon receiving an M.P.H. degree in the Accelerated M.B.A./M.P.H. Program in Health Care Management, the student will be able to:

- Conduct financial analyses, including reading and analyzing financial statements.
- Conduct economic analyses, including cost-effectiveness analysis, to inform public health management decision making.
- Apply operations management concepts to address organizational performance issues in health service organizations.
- Apply the principles of marketing analysis and planning to public health programs and health service organizations.
- Utilize statistical analysis skills to conduct health systems and policy research.
- Utilize research design and data management skills to conduct health policy and management research.
- Evaluate health care financing, regulatory, and delivery systems.
- Demonstrate written communication skills to effectively communicate in professional health policy and community settings.
- Demonstrate oral communication and presentation skills to effectively communicate in professional health policy and community settings.
- Utilize advocacy, persuasion, and negotiation skills to influence health policy and management decision making.
- Perform strategic analysis and planning for public health care organizations.
- Describe legal perspectives on health policy and management issues, including assessment of legal and regulatory environments in the context of public health.
- Apply ethical decision making in a health care context.
- Apply management problem-solving skills to improve functioning of organizations and agencies in health systems.
- Demonstrate leadership, team-based collaboration, and conflict management skills.
- Coach and provide constructive feedback to colleagues.
- Work with and incorporate perspectives of culturally diverse groups.

ADVANCED PROFESSIONAL M.P.H. PROGRAM

Mayur M. Desai, M.P.H., Ph.D., Director

The eleven-month Advanced Professional M.P.H. Program provides rigorous public health training to individuals with a doctoral-level (or equivalent) degree in a field related to public health (e.g., physicians, dentists, veterinarians, or those with a doctorate in the biological, behavioral, or social sciences) and to medical students who have completed their third year in an accredited medical school in the United States. The program is designed for mature individuals with clear goals in public health. Students can enter the program to gain skills in the public health sciences and to prepare for careers in a variety of settings, including academia; local, national, or international public health agencies; industry; and nonprofit foundations and research organizations. Physicians in preventive medicine, occupational and environmental medicine, and aerospace medicine residency programs can enter the program to complete their M.P.H. degree requirement.

Students concentrate in one of six tracks: Applied Biostatistics and Epidemiology, Social and Behavioral Sciences, Health Policy, Global Health, Preventive Medicine, or Occupational and Environmental Medicine. The program begins with an intensive seven-week summer session, followed by two full-time terms of study. Students may choose to complete the program on a part-time basis; however, all requirements must be completed within three years of the date of matriculation.

Curriculum for the Advanced Professional M.P.H. Program

APPLIED BIOSTATISTICS AND EPIDEMIOLOGY TRACK

Core Requirements

<i>Course number</i>	<i>Course title</i>	<i>Course units</i>
BIS 515c	Accelerated Biostatistics	2
CDE 505c	Accelerated Social and Behavioral Foundations of Health	1
CDE 515c	Accelerated Epidemiology	1
EPH 100a	Professional Skills Seminar	n/a
EPH 515a	Ethics and Public Health: An Introduction	n/a

One of the following:

HPM 510a	Introduction to Health Policy and Health Systems	1
HPM 560b	Health Economics and U.S. Health Policy	1

One of the following:

EHS 503a	Principles of Toxicology	1
EHS 507a	Environmental Epidemiology	1
EHS 510a	Principles of Environmental Health	1
EHS 511b	Applied Risk Assessment	1
EHS 575a	Introduction to Occupational and Environmental Medicine	1

One of the following:

CDE 596b	Global Health Justice Practicum	1
EPH 500b	Public Health Practicum	1
EPH 542b	Practice-Based Community Health Research	1

Track Requirements

CDE 534b	Applied Analytic Methods in Epidemiology	1
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One of the following:

BIS 540a	Fundamentals of Clinical Trials	1
CDE 650a	Introduction to Evidence-Based Medicine and Health Care	1

Two of the following:

BIS 623a	Applied Regression Analysis	1
BIS 625a	Categorical Data Analysis	1
BIS 628b	Longitudinal and Multilevel Data Analysis	1
BIS 630b	Applied Survival Analysis	1

Two additional biostatistics and/or epidemiology courses 2

Two elective courses 2

One of the following capstone courses:

CDE 574b	Developing a Health Promotion and Disease Prevention Intervention	1
CDE 617b	Developing a Research Proposal	1

SOCIAL AND BEHAVIORAL SCIENCES TRACK

Core Requirements

<i>Course number</i>	<i>Course title</i>	<i>Course units</i>
BIS 515c	Accelerated Biostatistics	2
CDE 505c	Accelerated Social and Behavioral Foundations of Health	1
CDE 515c	Accelerated Epidemiology	1
EPH 100a	Professional Skills Seminar	n/a
EPH 515a	Ethics and Public Health: An Introduction	n/a

One of the following:

HPM 510a	Introduction to Health Policy and Health Systems	1
HPM 560b	Health Economics and U.S. Health Policy	1

One of the following:

EHS 503a	Principles of Toxicology	1
EHS 507a	Environmental Epidemiology	1
EHS 510a	Principles of Environmental Health	1
EHS 511b	Applied Risk Assessment	1
EHS 575a	Introduction to Occupational and Environmental Medicine	1

One of the following:

CDE 596b	Global Health Justice Practicum	1
EPH 500b	Public Health Practicum	1
EPH 542b	Practice-Based Community Health Research	1

Track Requirements

CDE 534b	Applied Analytic Methods in Epidemiology	1
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One of the following:

CDE 577b	Interdisciplinary Research Methods in the Social and Behavioral Sciences	1
CDE 580b	Qualitative Research Methods	1

Two of the following (or permission of academic adviser to substitute):

CDE 531a	Health and Aging	1
CDE 545b	Health Disparities by Race and Social Class	1
CDE 572a	Obesity Prevention and Lifestyle Interventions	1
CDE 573a	Social and Cultural Factors in Mental Health and Illness	1
CDE 581a	Stigma and Health	1
CDE 585a	Sexuality, Health, and Human Rights	1
CDE 594a	Maternal-Child Public Health Nutrition	1
CDE 596b	Global Health Justice Practicum	1

Four elective courses		4
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One of the following capstone courses:

CDE 574b	Developing a Health Promotion and Disease Prevention Intervention	1
CDE 617b	Developing a Research Proposal	1

HEALTH POLICY TRACK

Core Requirements

<i>Course number</i>	<i>Course title</i>	<i>Course units</i>
BIS 515c	Accelerated Biostatistics	2
CDE 505c	Accelerated Social and Behavioral Foundations of Health	1
CDE 515c	Accelerated Epidemiology	1
EPH 100a	Professional Skills Seminar	n/a
EPH 515a	Ethics and Public Health: An Introduction	n/a

One of the following:

EHS 503a	Principles of Toxicology	1
EHS 507a	Environmental Epidemiology	1
EHS 510a	Principles of Environmental Health	1
EHS 511b	Applied Risk Assessment	1
EHS 575a	Introduction to Occupational and Environmental Medicine	1

One of the following:

CDE 596b	Global Health Justice Practicum	1
EPH 500b	Public Health Practicum	1
EPH 542b	Practice-Based Community Health Research	1
HPM 555a or b	Health Policy and Health Care Management Practicum	1

Track Requirements

HPM 510a	Introduction to Health Policy and Health Systems	1
HPM 514b	Health Politics, Governance, and Policy	1
HPM 570a	Cost-Effectiveness Analysis and Decision Making	1
HPM 583b	Methods in Health Services Research	1
HPM 586a	Microeconomics for Health Policy and Health Management	1

One additional Health Policy and Management course 1

Three elective courses 3

One of the following capstone courses:

HPM 561b	Managing Health Care Organizations	1
HPM 597b	Capstone Course in Health Policy	1

GLOBAL HEALTH TRACK

Core Requirements

<i>Course number</i>	<i>Course title</i>	<i>Course units</i>
BIS 515c	Accelerated Biostatistics	2
CDE 505c	Accelerated Social and Behavioral Foundations of Health	1
CDE 515c	Accelerated Epidemiology	1
EPH 100a	Professional Skills Seminar	n/a
EPH 515a	Ethics and Public Health: An Introduction	n/a

One of the following:

HPM 510a	Introduction to Health Policy and Health Systems	1
HPM 560b	Health Economics and U.S. Health Policy	1

One of the following:

EHS 503a	Principles of Toxicology	1
EHS 507a	Environmental Epidemiology	1
EHS 510a	Principles of Environmental Health	1
EHS 511b	Applied Risk Assessment	1
EHS 575a	Introduction to Occupational and Environmental Medicine	1

One of the following:

CDE 596b	Global Health Justice Practicum	1
EPH 500b	Public Health Practicum	1
EPH 542b	Practice-Based Community Health Research	1

Track Requirements

CDE 534b	Applied Analytic Methods in Epidemiology	1
EPH 591a and b	Global Health Seminar	n/a
HPM 566b	Critical Issues in Global Health	1

Three Global Health courses from at least two of the five perspectives on public health (list of courses published each fall) 3

Three elective courses 3

One of the following capstone courses:

CDE 574b	Developing a Health Promotion and Disease Prevention Intervention	1
CDE 617b	Developing a Research Proposal	1
HPM 561b	Managing Health Care Organizations	1
HPM 597b	Capstone Course in Health Policy	1

PREVENTIVE MEDICINE TRACK

Core Requirements

<i>Course number</i>	<i>Course title</i>	<i>Course units</i>
BIS 515c	Accelerated Biostatistics	2
CDE 505c	Accelerated Social and Behavioral Foundations of Health	1
CDE 515c	Accelerated Epidemiology	1
EPH 100a	Professional Skills Seminar	n/a
EPH 515a	Ethics and Public Health: An Introduction	n/a

One of the following:

HPM 510a	Introduction to Health Policy and Health Systems	1
HPM 560b	Health Economics and U.S. Health Policy	1

One of the following:

CDE 596b	Global Health Justice Practicum	1
EPH 500b	Public Health Practicum	1
EPH 542b	Practice-Based Community Health Research	1

Track Requirements

CDE 534b	Applied Analytic Methods in Epidemiology	1
EHS 575a	Introduction to Occupational and Environmental Medicine	1

One of the following:

CDE 541a	Community Health Program Evaluation	1
CDE 562a	Nutrition and Chronic Disease	1
CDE 572a	Obesity Prevention and Lifestyle Interventions	1

One of the following:

BIS 538b	Survey Sampling: Methods and Management	1
BIS 540a	Fundamentals of Clinical Trials	1
CDE 650a	Introduction to Evidence-Based Medicine and Health Care	1

One of the following:

EHS 511b	Applied Risk Assessment	1
EHS 573b	Epidemiological Issues in Occupational and Environmental Medicine	1

Four elective courses 4

One of the following capstone courses:

CDE 574b	Developing a Health Promotion and Disease Prevention Intervention	1
CDE 617b	Developing a Research Proposal	1

OCCUPATIONAL AND ENVIRONMENTAL MEDICINE TRACK (YALE OEM FELLOWS)

Core Requirements

<i>Course number</i>	<i>Course title</i>	<i>Course units</i>
BIS 505a	Introduction to Statistical Thinking I	1
CDE 505a	Social and Behavioral Foundations of Health	1
CDE/EMD 508a	Principles of Epidemiology I	1
EHS 503a	Introduction to Toxicology	1
EPH 100a	Professional Skills Seminar	n/a
EPH 515a	Ethics and Public Health: An Introduction	n/a

One of the following:

HPM 510a	Introduction to Health Policy and Health Systems	1
HPM 560b	Health Economics and U.S. Health Policy	1

Track Requirements

CDE 534b	Applied Analytic Methods in Epidemiology	1
EHS 505a	Fundamentals of Occupational Hygiene, Safety, and Ergonomics	1
EHS 511b	Applied Risk Assessment	1
EHS 573b	Epidemiological Issues in Occupational and Environmental Medicine	1
EHS 575a	Introduction to Occupational and Environmental Medicine	1
EPH 525b	Thesis	2
Four elective courses		4

Note: Yale Occupational and Environmental Medicine Fellows may count their practicum year, accredited by the Accreditation Council for Graduate Medical Education, as the required practice experience for the M.P.H. program.

OCCUPATIONAL AND ENVIRONMENTAL MEDICINE TRACK (11-MONTH STUDENTS)

Core Requirements

Course number	Course title	Course units
BIS 515c	Accelerated Biostatistics	2
CDE 505c	Accelerated Social and Behavioral Foundations of Health	1
CDE 515c	Accelerated Epidemiology	1
EHS 511b	Applied Risk Assessment	1
EPH 100a	Professional Skills Seminar	n/a
EPH 515a	Ethics and Public Health: An Introduction	n/a

One of the following:

HPM 510a	Introduction to Health Policy and Health Systems	1
HPM 560b	Health Economics and U.S. Health Policy	1

One of the following:

CDE 596b	Global Health Justice Practicum	1
EPH 500b	Public Health Practicum	1
EPH 542b	Practice-Based Community Health Research	1

Track Requirements

CDE 534b	Applied Analytic Methods in Epidemiology	1
EHS 503a	Principles of Toxicology	1
EHS 505a	Fundamentals of Occupational Hygiene, Safety, and Ergonomics	1
EHS 573b	Epidemiological Issues in Occupational and Environmental Medicine	1
EHS 575a	Introduction to Occupational and Environmental Medicine	1
Three elective courses		3

One of the following capstone courses:

CDE 574b	Developing a Health Promotion and Disease Prevention Intervention	1
CDE 617b	Developing a Research Proposal	1

Competencies for the Advanced Professional M.P.H. Program

CORE CURRICULUM

Upon completing the core curriculum of the M.P.H. program, the student will be able to:

- Demonstrate a knowledge base in the disciplines of biostatistics, chronic and infectious disease epidemiology, health systems, public policy, social and behavioral sciences, and environmental health.
- Apply basic research skills to specific public health problems in both group and individual settings, including the ability to define problems; construct, articulate,

and test hypotheses; draw conclusions; and communicate findings to a variety of audiences.

- Explain the interrelationships among a multitude of factors that can impact a public health problem, including scientific, medical, environmental, cultural, social, behavioral, economic, political, and ethical factors.
- Review, critique, and evaluate public health reports and research articles.
- Apply public health concepts, principles, and methodologies obtained through formal course work to actual problems experienced in the community or work environment.
- Critically evaluate programs, interventions, and outcomes that relate to public health practice.
- Apply ethical standards and professional values as they relate to the practice of public health.
- Demonstrate sensitivity to the social context within which public health professionals practice.

APPLIED BIOSTATISTICS & EPIDEMIOLOGY TRACK

Upon receiving an M.P.H. degree in the Advanced Professional M.P.H. Program, with a concentration in Applied Biostatistics and Epidemiology, the student will be able to:

- Describe intermediate to advanced concepts of random variation and commonly used statistical probability distributions.
- Develop an efficient design for collecting, recording, and storing data collected in the conduct of public health and medical research.
- Design efficient computer programs for study management, statistical analysis, as well as presentation using SAS and other programming languages.
- Produce edited data sets suitable for statistical analyses.
- Produce working tables and statistical summaries describing research in health science.
- Evaluate the scientific merit and feasibility of epidemiologic study designs.
- Describe the epidemiology of common chronic diseases.
- Synthesize information from a variety of epidemiologic and related studies.
- Design and carry out epidemiologic studies, with minimal supervision.
- Analyze data and draw appropriate inferences from epidemiologic studies at an intermediate to advanced level, using a variety of analytical tools.
- Write an NIH-type epidemiologic research proposal.
- Identify, interpret, and use routinely collected data on disease occurrence.
- Review, critique, and evaluate epidemiologic reports and research articles, as well as the broader health sciences literature, at an intermediate level, using principles of epidemiology and biostatistics.
- Develop written presentations based on intermediate to advanced statistical and epidemiologic analyses for both public health professionals and educated lay audiences.

SOCIAL & BEHAVIORAL SCIENCES TRACK

Upon receiving an M.P.H. degree in the Advanced Professional M.P.H. Program, with a concentration in Social and Behavioral Sciences, the student will be able to:

- Identify the effects of social, psychological, and behavioral factors on individual and population health, including prevention, treatment, and management of chronic disease, adjustment to illness, adherence to treatment regimens, and promotion of recovery.
- Analyze health from multiple levels, including the individual, social group, community, and society.
- Critically evaluate and interpret the public health scientific literature as presented in professional journals and the popular media, including descriptive, analytic, and intervention studies.
- Construct research hypotheses and design a study to test these hypotheses.
- Apply social, psychological, and behavioral theory in the design, implementation, and evaluation of prevention interventions aimed toward: (a) decreasing health-damaging behaviors (e.g., risky sex); (b) increasing health-promoting behaviors (e.g., exercise); and (c) increasing psychosocial well-being (e.g., coping with chronic illness).
- Design an intervention aimed at changing a particular health behavior or preventing a disease.
- Develop procedures and training materials to implement effective behavioral interventions.
- Describe how culture, social inequities, and biology influence health across the lifespan.
- Identify ways to address health inequalities and promote health equity.
- Describe the appropriate statistical analyses to examine different types of research questions in the social and behavioral sciences.
- Demonstrate oral and written communication and presentation skills to effectively communicate and disseminate results to various professional and community audiences.
- Explain the dynamic interaction between policies and the social and behavioral sciences.
- Apply the ethical principles involved in social and behavioral sciences as they relate to public health.
- Write an NIH-type research proposal.

HEALTH POLICY TRACK

Upon receiving an M.P.H. degree in the Advanced Professional M.P.H. Program, with a concentration in Health Policy, the student will be able to:

- Apply the principles of microeconomics (e.g., markets and market failure) in a health policy context.
- Conduct economic analysis, including cost-effectiveness analysis, to inform public health decision making.
- Describe and assess the historical evolution of the U.S. health care system.
- Describe the role of the major U.S. political institutions in health policy and politics.
- Utilize statistical analysis skills to conduct health systems and policy research.
- Utilize research design and data management skills to conduct health policy and management research.

- Evaluate health care financing, regulatory, and delivery systems.
- Demonstrate written communication skills to effectively communicate in professional health policy and community settings.
- Demonstrate oral communication and presentation skills to effectively communicate in professional health policy and community settings.
- Describe conceptual frameworks for political agenda setting.
- Perform strategic analysis and planning for public health care organizations.
- Evaluate health policies in terms of efficiency, efficacy, equity, and feasibility.
- Describe legal perspectives on health policy and management issues, including assessment of legal and regulatory environments in the context of public health.
- Apply ethical decision making in a health care context.
- Demonstrate leadership, team-based collaboration, and management skills.
- Work with and incorporate the perspectives of culturally diverse groups.

GLOBAL HEALTH TRACK

Upon receiving an M.P.H. degree in the Advanced Professional M.P.H. Program, with a concentration in Global Health, the student will be able to:

- Describe the major causes of morbidity and mortality in the world and in the world's major regions.
- Describe the epidemiology, transmission, and pathogenesis of global infectious diseases, including neglected tropical diseases.
- Apply burden of disease measures to the analysis of global health disparities.
- Explain the causes of global health disparities.
- Review methods available to control each of the world's major diseases.
- Evaluate which disease control measures would be most appropriate for a given setting.
- Describe cross-national determinants of health, including globalization, international trade policy, practices of multinational corporations, urbanization, migration, international conflict, and environmental change.
- Analyze global health problems, taking into account their social, political, economic, legal, and human rights dimensions.
- Critically assess the global health governance infrastructure and analyze alternative approaches for health care delivery, regulation, and financing.
- Apply relevant concepts and theories to policy and management challenges faced by health systems in low-, middle-, and high-income countries.
- Assess global health issues from an interdisciplinary perspective, including public health disciplines, medicine, international relations, environmental studies, political science, law, anthropology, and others.
- Apply necessary leadership skills to serve as bridges between the global health research and practice settings.
- Apply quantitative and qualitative research methods to global health issues.
- Explain and propose solutions for the unique challenges involved in conducting public health research in low-resource settings.

PREVENTIVE MEDICINE TRACK

Upon receiving an M.P.H. degree in the Advanced Professional M.P.H. Program, with a concentration in Preventive Medicine, the student will be able to:

- Evaluate the scientific merit and feasibility of epidemiologic study designs.
- Construct research hypotheses and design a study to test these hypotheses.
- Synthesize information from a variety of epidemiologic and related studies.
- Describe the appropriate statistical analyses to examine different types of epidemiologic and social and behavioral research questions.
- Identify, interpret, and use routinely collected data on disease occurrence.
- Review, critique, and evaluate epidemiologic reports and research articles at an intermediate level.
- Write an NIH-type research proposal.
- Apply social, psychological, and behavioral theory in the design, implementation, and evaluation of prevention interventions.
- Describe the role of health behavior in disease.
- Evaluate and interpret health behavior change interventions.
- Review, interpret, and evaluate epidemiologic reports and research articles pertaining to occupational and environmental risk factors.
- Review, interpret, and evaluate toxicological reports and research articles pertaining to occupational and environmental risk factors.
- Synthesize complex data sources about occupational and environmental hazards to make inferences about human risk.

OCCUPATIONAL & ENVIRONMENTAL MEDICINE TRACK

Upon receiving an M.P.H. degree in the Advanced Professional M.P.H. Program, with a concentration in Occupational and Environmental Medicine, the student will be able to:

- Evaluate the scientific merit and feasibility of occupational and environmental health study designs.
- Describe and apply alternative strategies for assessment of occupational and environmental exposures.
- Design and conduct an occupational/environmental health study, with minimal supervision.
- Review, interpret, and evaluate epidemiologic reports and research articles pertaining to occupational and environmental risk factors.
- Review, interpret, and evaluate toxicological reports and research articles pertaining to occupational and environmental risk factors.
- Synthesize complex data sources about occupational and environmental hazards to make inferences about human risk.
- Evaluate work, home, and other environments for potential hazardous exposures.
- Utilize industrial hygiene principles to develop a plan to evaluate and control workplace hazards.
- Communicate occupational and environmental health information to employers, workers, professional audiences, and the general public, orally and in writing.

Master of Science in Public Health

The Master of Science (M.S.) degree program in Public Health (PH) is designed with an emphasis on mastering the skills in individual specialty areas within public health. Programs are currently offered in Biostatistics and Chronic Disease Epidemiology. The length of study leading to the M.S. degree is one year full-time for the Chronic Disease Epidemiology track and two years full-time for the Biostatistics track. Part-time students must complete the degree within five years of matriculation.

The M.S. in PH is offered through the School's affiliation with the Graduate School of Arts and Sciences. The Graduate Studies Executive Committee (GSEC) and the director of graduate studies (DGS) are responsible for overseeing the progress of M.S. students.

BIOSTATISTICS TRACK (BIS)

The M.S. in Biostatistics is a two-year program. It is designed to train students to meet the growing need in managed care organizations, medical research, and the pharmaceutical industry for graduates with technical skills in data analysis. In contrast to the more general M.P.H. degree, the M.S. degree emphasizes the mastery of biostatistical skills from the beginning of the plan of study. While graduates of this program may apply to the Ph.D. degree program, the M.S. degree is itself quite marketable as a terminal degree.

Degree Requirements

The Biostatistics track requires a minimum of 12 courses (excluding the Ethics course, EPH 600b; and BIS 525a and b, BIS 695c) plus Master's Thesis Research.

Curriculum

REQUIRED COURSES

<i>Course number</i>	<i>Course title</i>	<i>Course units</i>
†BIS 525a and b	Seminar in Biostatistics	n/a
BIS 540a	Fundamentals of Clinical Trials	1
BIS 623a	Applied Regression Analysis	1
BIS 625a	Categorical Data Analysis	1
BIS 628b	Longitudinal and Multilevel Data Analysis	1
BIS 630b	Applied Survival Analysis	1
BIS 650a,b	Master's Thesis Research	2
†BIS 695c	Summer Internship in Biostatistical Research	n/a
‡CDE 508a	Principles of Epidemiology I	1
†EPH 600b	Research Ethics and Responsibility	n/a
*STAT 541a	Probability Theory	1
*STAT 542b	Theory of Statistics	1

*These courses are offered in the Graduate School of Arts and Sciences.

†These courses do not count toward the twelve required courses.

‡Students entering the program with an M.P.H. or relevant graduate degree may be exempt.

In addition, students must complete four elective courses. Two of the electives must be in Biostatistics, chosen from the list below. Two additional electives are required and can be taken in any area relevant to the student's interest. Students will also be required to take a Professional Skills Seminar (dates and times announced during the fall term).

Biostatistics electives are to be selected from these courses: BIS 557a, Computational Statistics; BIS 561b, Advanced Topics and Case Studies in Multicenter Clinical Trials; BIS 567a, Bayesian Statistics; BIS 643b, Theory of Survival Analysis; BIS 646b, Nonparametric Statistical Methods and Their Applications; BIS 651b, Spatial Statistics in Public Health; and BIS 691b, Theory of Generalized Linear Models. Students demonstrating a mastery of topics covered by the required courses may replace them with more advanced courses but must receive written permission from the DGS prior to enrolling in the substitute courses.

Competencies

Upon receiving an M.S. in Public Health, with a concentration in Biostatistics, the student will be able to:

- Describe advanced concepts of probability, random variation, and commonly used statistical probability distributions.
- Develop an efficient design for collecting, recording, and storing data collected in the conduct of public health and medical research.
- Develop sample size and statistical power calculations for basic study designs including those utilized in clinical trials.
- Design efficient computer programs for study management, statistical analysis, as well as presentation using SAS and other programming languages.
- Produce edited data sets suitable for statistical analyses.
- Apply advanced informatics techniques with vital statistics and public health records in the description of public health characteristics and in public health research and evaluation.
- Perform analyses of stated hypotheses using a variety of analytical tools including analysis of variance, multiple regression, nonparametric statistics, logistic regression, multivariate analyses, and methods for analyzing rates and failure-time data.
- Interpret results of advanced statistical analyses and use these results to make relevant inferences from data.
- Produce working tables and statistical summaries describing research in health science.
- Develop written presentations based on intermediate to advanced statistical analyses for both public health professionals and educated lay audiences.
- Develop oral presentations based on intermediate to advanced statistical analyses for both public health professionals and educated lay audiences.

Master's Thesis

In the second year of the program, the student is required to execute a program of independent research under the direction of a faculty member. This project usually falls into one of these main areas:

1. Development of a new statistical theory or methodology.
2. A computer-based simulation study to illustrate properties of an existing method.
3. The analysis of a real data set.

The student is required to prepare a written thesis under the supervision of a Biostatistics faculty member. Upon completion of the thesis, the student will make an oral presentation of the results of his/her work.

For specific instructions on the organization, mechanics, and publication of the thesis, see Appendix II: Thesis Guidelines.

CHRONIC DISEASE EPIDEMIOLOGY TRACK (CDE)

There is a high demand for well-trained graduates in chronic disease epidemiology. This track provides intensive training in epidemiology and research methods for medical and health care professionals, or others seeking the skills necessary to conduct epidemiological research in their professional practice.

Applicants should have a basic understanding of quantitative science and statistics. It is recommended that candidates have strong science backgrounds and demonstrated competency in statistical analysis and logical thinking. Applicants from rigorous programs in the biological or social sciences will be given preference. At a minimum, applicants should have one year of course work in statistics or the equivalent prior to enrolling in this program. Summer courses are available to fulfill this requirement. Full-time applicants are preferred.

Degree Requirements

The CDE track consists of required and elective course work and satisfactory completion of the Capstone experience. A total of ten courses is required (excluding the Ethics course, EPH 600b; and Seminar, CDE 525). It is expected that this program will be completed during a single academic year. Students with an M.P.H. or relevant graduate degree may be eligible to substitute advanced courses for some of the required courses. Written permission of the DGS is required prior to enrolling in substitute courses.

Curriculum

REQUIRED COURSES

<i>Course number</i>	<i>Course title</i>	<i>Course units</i>
BIS 623a	Applied Regression Analysis	1
BIS 625a	Categorical Data Analysis	1
BIS 630b	Applied Survival Analysis	1
CDE/EMD 508a	Principles of Epidemiology I	1
CDE 516b	Principles of Epidemiology II	1
CDE 523b	Measurement Issues in Chronic Disease Epidemiology	1
†CDE 525a,b	Seminar in Chronic Disease Epidemiology/Social and Behavioral Sciences	n/a
*CDE 617b	Developing a Research Proposal	1
†EPH 600b	Research Ethics and Responsibility	n/a

Suggested electives (three courses are required):

BIS 540a	Fundamentals of Clinical Trials	1
BIS 561b	Advanced Topics and Case Studies in Multicenter Clinical Trials	1
BIS 643b	Theory of Survival Analysis	1
BIS 645b	Statistical Methods in Human Genetics	1
CDE/EHS 520b	Case-Based Learning for Genetic and Environmental Diseases	1
CDE 531a	Health and Aging	1
CDE 532b	Epidemiology of Cancer	1
CDE 533b	Topics in Perinatal Epidemiology	1
CDE 535b	Epidemiology of Heart Disease and Stroke	1
CDE 562a	Nutrition and Chronic Disease	1
CDE 597a	Genetic Concepts in Public Health	1
*CDE 600a or b	Directed Readings	1
CDE 634b	Advanced Applied Analytical Methods in Epidemiology and Public Health	1
CDE 650a	Introduction to Evidence-Based Medicine and Health Care	1

*In the capstone course CDE 617b, the student is required to develop a grant application that is deemed reasonably competitive by the instructor. An alternative to this capstone course is an individualized tutorial (CDE 600a or b), in which the student completes a manuscript that is suitable for submission for publication in a relevant journal.

†These courses do not count toward the ten required courses.

Competencies

Upon receiving an M.S. in Public Health, with a concentration in Chronic Disease Epidemiology, the student will be able to:

- Explain and apply the terminology and definitions of epidemiology.
- Evaluate the scientific merit and feasibility of epidemiologic study designs.
- Describe the epidemiology of common chronic diseases.
- Synthesize information from a variety of epidemiologic and related studies.
- Design epidemiologic studies at an intermediate level.
- Analyze data and draw appropriate inferences from epidemiologic studies at an intermediate to advanced level, using a variety of analytical tools including multivariate logistic regression, Poisson regression, linear regression, and survival analysis.
- Write an epidemiologic research proposal or a publishable epidemiologic article.
- Identify, interpret, and use routinely collected data on disease occurrence.
- Review, critique, and evaluate epidemiologic reports and research articles at an intermediate level.

Doctoral Degree

Doctoral training has been part of Yale's mission since early in its history. The University awarded the first Ph.D. in North America in 1861, and the doctoral program in public health began with the establishment of the department in 1915. Six years later, in 1922, Yale conferred the Doctor of Philosophy (Ph.D.) in Public Health on two candidates.

Within the Yale academic community, the Ph.D. is the highest degree awarded by the University. The School of Public Health offers studies toward the Ph.D. degree through its affiliation with the Graduate School of Arts and Sciences. The Graduate School makes the final decisions on accepting students into the program, admission to candidacy, and awarding the degree.

The primary mission of the doctoral program in Public Health (PH) is to provide scholars with the disciplinary background and skills required to contribute to the development of our understanding of better ways of measuring, maintaining, and improving the public's health. The core of such training includes the mastery of research tools in the specialty discipline chosen by the candidate. Public health spans disciplines that use tools available in the laboratory, field research, social sciences, the public policy arena, and mathematics. Students engage in a highly focused area of research reflecting scholarship at the doctoral level but are exposed to a broad view of public health as seen in the diverse research interests of the School's faculty.

COMPETENCIES FOR THE PH.D. IN PUBLIC HEALTH

Upon receiving a Ph.D. in Public Health, the student will be able to:

- Critically evaluate public health and related literature.
- Discuss and critically evaluate the broad literature of the student's discipline.
- Review in depth the background and research advances in the student's specific research area.
- Apply at an advanced level the research methodology of the student's broader discipline and, in particular, the student's specific research area.
- Present research to colleagues and professionals on a national and international level at professional meetings.
- Design a course in the student's broad discipline.
- Explain the principles of research ethics and apply these principles to specific research projects.
- Design and conduct an advanced, original research project in the student's discipline.
- Generate data to create publishable manuscripts that represent important contributions to the literature.

ACADEMIC ADVISING

Each student is assigned to an academic adviser at the time of matriculation. The academic adviser is available for help with general academic questions, course selections, choosing a dissertation project, and preparation for the qualifying examinations. A student may request a change of his or her academic adviser by writing to the director of

graduate studies (DGS). The request must be co-signed by both the previous and new academic advisers.

TEACHING FELLOWSHIPS

Teaching experience is regarded as an integral part of the graduate training program and is typically completed during the second and third years of study. First-year students are encouraged to focus their efforts on course work and in most instances are not permitted to serve as Teaching Fellows. However, first-year students may be allowed to serve as Teaching Fellows if they have been awarded advanced standing. Advanced standing is only available to students who have completed previous graduate study at Yale (e.g., M.S. or M.P.H. programs). If a student has been awarded one year of advanced standing, he or she will be allowed to teach in both the fall and spring terms of the first year. If a student has been awarded one term of advanced standing, he or she will only be allowed to teach during the spring term of the first year.

All doctoral students are required to complete four terms as a Teaching Fellow. Graduate research assistantship opportunities may take the place of teaching in the third year of study. A waiver of 10 hours is possible if the student is working as a Project Assistant (generally no more than 10 hours per week and with prior approval of the DGS). By year four, all students are expected to be engaged in full-time research activities.

DEGREE REQUIREMENTS

There are five departments in PH in which doctoral students may choose a specialty. Requirements for each department vary and are outlined below under Departmental Requirements. In addition, all candidates for the Ph.D. degree must conform to the requirements of the Graduate School of Arts and Sciences.

Required Course Work

The normal requirement for the degree of Doctor of Philosophy is typically four to five years of graduate study. Generally, the first two years are devoted primarily to course work. Each student must satisfactorily complete a minimum of ten courses or their equivalent and must satisfy the individual departmental requirements (see below for course requirements in each department). All first-year PH doctoral students are required to participate in a course covering both practical and theoretical issues in research ethics (EPH 600b, Research Ethics and Responsibility); this course is in addition to the minimum required courses. The Graduate School requires that Ph.D. students achieve a grade of Honors in at least two doctoral-level courses. PH doctoral students are expected to maintain a High Pass average.

Qualifying Examinations

The required qualifying examinations are usually taken at the end of the second year of study. In order to meet the different departmental needs, each department has developed a qualifying examination format; details are provided in each departmental program description below. The qualifying examinations serve to demonstrate that the candidate

has mastered the background and the research tools required for dissertation research. The qualifying examinations are usually scheduled in June, all within a three-week period. Students who have not completed the qualifying examinations with an average grade of High Pass by the end of their second year will not be permitted to register for the third year.

Prospectus Guidelines

Before the end of the spring term of the third year, each student must submit a Dissertation Prospectus, i.e., a written summary of the planned nature and scope of the dissertation research, together with a provisional title for the dissertation. It is strongly recommended that students begin working with their thesis adviser on this process early in the third year. Ideally students should submit the names of Dissertation Advisory Committee (DAC) members during the fall term of the third year and then submit the prospectus during the spring term of the third year. Students must have both the DAC members and the prospectus approved by the end of the third year (May).

The DAC consists of at least three members, including the thesis adviser, who must have a Graduate School appointment and will chair the committee. Two members are expected to be Yale School of Public Health faculty, but participation of faculty members from other departments is encouraged. An additional committee member may be selected from outside the University if he or she is a recognized authority in the area of the dissertation; a supporting curriculum vitae must be provided. The student should also submit a one-page specific aims (for the research plan) and a rationale for each committee member. The proposed DAC members must sign the one-page specific aims stating that they have agreed to serve on the committee. The Graduate Studies Executive Committee (GSEC) prefers that students submit this one-page specific aims document for approval prior to developing the prospectus. Once the GSEC approves the student's DAC and specific aims, the student works with his or her committee to develop the prospectus.

The purpose of the prospectus is to formalize an understanding between the student, the DAC, and the GSEC regarding the scholarship of a proposed dissertation project. The prospectus should:

- Provide a detailed description of the research plan as outlined below, including title, topic, background, significance, study questions, analytic plan, and methods;
- Establish a consensus between the student, the DAC, and the GSEC that the research plan meets the requisite standards of originality, scope, significance, and virtuosity;
- Formalize the DAC's willingness to work with the student to see the proposed research plan to successful completion.

The prospectus should be written in clear, plain English with minimal jargon, abbreviations, or colloquialisms and is limited to a *maximum* of twenty pages (double-spaced). All tables, graphs, figures, diagrams, and charts must be included within the twenty-page limit. References are not part of the page limit. Be succinct and remember that there is no requirement to use all twenty pages. A prospectus found not to comply with these requirements will be returned without review.

The following format should be used (similar to NIH guidelines):

1. Title of proposed dissertation (can be a working title).

2. Specific aims (one page): A self-contained description of the project, which should be informative to other persons working in the same or related fields. State concisely the goals of the proposed research and summarize the expected outcome(s), including the impact that the results of the proposed research will exert on the research field(s) involved.
3. Research strategy: Use the following subsections:
 - a. Significance: This section should place the research project in context and describe the proposed research in a manner intelligible to a nonspecialist. This should include a brief but critical evaluation of the relevant literature and a description of how the proposed research project will advance scientific knowledge and/or technical capability in one or more broad fields.
 - b. Innovation: Explain how the application challenges and seeks to shift current research paradigm(s). Describe any novel theoretical concepts, approaches or methodologies, instrumentation, or interventions to be developed or used, and any advantage(s) over existing methodologies, instrumentation, or interventions.
 - c. Approach: Outline the research project envisioned at this time and sketch out the plan to attain the overall goals of the project. Describe the overall strategy, methodology, and analyses to be used. Include preliminary data, if available. Acknowledge pitfalls and limitations of the research, and if possible suggest alternative strategies.
4. References: Should be included at the end (not counted in the page limit).

The prospectus submitted to the GSEC must be the version approved by the student's DAC and must be submitted together with the Submission of Dissertation Prospectus form.

The GSEC will review the prospectus and may request changes to either the DAC or the prospectus. Once the GSEC has approved the prospectus, it will be submitted to the Graduate School registrar.

Weekly meetings with the chair of the DAC are recommended. Regular face-to-face meetings of the full DAC are invaluable and are expected throughout the student's research toward the thesis. The DAC is expected to meet at least twice each year, and more frequently if necessary. Since dissertation progress reports at the Graduate School are due at the close of the spring term, it is advised that one of the meetings be scheduled in March or April. In doing so, the thesis adviser, student, and DGS will have current information on the student's progress for use in completing the dissertation progress report online. The student schedules the meetings of the DAC. The chairperson of the DAC, i.e., the thesis adviser, produces a summary report outlining progress and plans for the coming year. The document is to be distributed to the other committee members for comments. The student and the DGS are to receive a copy of the document from the DAC chair.

Because the prospectus is required fairly early in the dissertation research, the content of a thesis may change over time, and thus the student should not feel bound by what is submitted. However, major changes to the direction of research described in the prospectus should be discussed with the DAC and approved by the GSEC.

Admission to Candidacy

After all predissertation requirements are successfully completed (course requirements, two Honors grades, overall High Pass average, qualifying examinations, dissertation prospectus), the student will be admitted to candidacy for the Ph.D. degree. These requirements are typically met in three years. Customarily, students who have not been admitted to candidacy will not be permitted to register for the fourth year. Exceptions must be approved in advance by the DGS and the Graduate School associate dean. When students advance to candidacy, the registrar's office automatically submits a petition for the awarding of the M.Phil. degree.

THE THESIS/DISSERTATION

The Ph.D. thesis in PH should be of publishable quality and represent a substantial contribution to the advancement of knowledge in a field of scholarship. The Graduate School policy in regard to the dissertation is as follows:

The dissertation should demonstrate the student's mastery of relevant resources and methods and should make an original contribution to knowledge in the field. The originality of a dissertation may consist of the discovery of significant new information or principles of organization, the achievement of a new synthesis, the development of new methods or theories, or the application of established methods to new materials. Normally, it is expected that a dissertation will have a single topic, however broadly defined, and that all parts of the dissertation will be interrelated. This does not mean that sections of the dissertation cannot constitute essentially discrete units. Dissertations in the physical and biological sciences, for example, often present the results of several independent but related experiments. Given the diverse nature of the fields in which dissertations are written and the wide variety of topics that are explored, it is impossible to designate an ideal length for the dissertation. Clearly, however, a long dissertation is not necessarily a better one. The value of a dissertation ultimately depends on the quality of its thought and the clarity of its exposition. In consultation with their faculty advisers and the director of graduate studies, students should give serious thought to the scale of proposed dissertation topics. There should be a reasonable expectation that the project can be completed in two to three years.

The dissertation may be presented as a single monograph as a major publication, or as (typically) a minimum of three first-authored scientific papers. One or more of the papers should be published, accepted for publication, or be in submission. The collected paper option does not imply that any combination of papers would be acceptable. For example, three papers related to background material (review papers), or three papers that reported associations of three unrelated exposures, or three papers of the same exposure but reporting different outcomes would not be acceptable. Rather, it is expected that the papers represent a cohesive, coherent, and integrated body of work. For example, one paper might be a systematic review and meta-analysis of the topic, another might develop a new methodological approach, and the third might apply those new methods to an area of current public health interest. In the collected paper option, the final thesis must include introductory and discussion chapters to summarize and integrate the published papers.

The DAC reviews the progress of the dissertation research and decides when the dissertation is ready to be submitted to the readers. This decision is made based on a closed defense of the dissertation. The dissertation defense involves a formal oral presentation to the DAC and other invited faculty. Upon completion of the closed defense, the chair of the DAC submits its recommendation to the GSEC, and its recommendation of suitable readers.

There will be a minimum of three readers, one of whom is at YSPH. The second reader can be from YSPH or another Yale department. Both Yale readers must hold a Graduate School appointment, and at least one should be a senior faculty member. The third reader must be selected from outside the University. All readers must be recognized authorities in the area of the dissertation. The outside reader must submit a curriculum vitae for review by the GSEC. The outside reader should be an individual who has not coauthored a publication(s) with members of the student's DAC and/or the student within the preceding three years. Members of the DAC are not eligible to serve as readers. After the completed readers' reports are received by the Graduate School, they are reviewed by the DGS and the GSEC prior to making a School of Public Health recommendation to the Graduate School that the degree be awarded. The DAC may be asked to comment on the readers' reports before recommendations are made to the Graduate School.

Oral Presentation of the Doctoral Dissertation

Doctor of Philosophy (Ph.D.) dissertations in PH must be presented in a public seminar. This presentation is scheduled after the closed defense, after submission of the dissertation to the readers, and preferably prior to the receipt and consideration of the readers' reports. At least one member each of the DAC and GSEC is expected to attend the presentation. It is expected to be presented during the academic term in which the dissertation was submitted and must be widely advertised within YSPH.

DEPARTMENTAL REQUIREMENTS

The specific requirements with regard to courses, qualifying examinations, and admission to candidacy set by PH departments are described below.

Biostatistics

Biostatistics involves the development and application of sound statistical and mathematical principles to research in the health sciences. Because original theoretical research in biostatistics flows from medical research, it is essential that the foundations of methodological development be firmly grounded in sound principles of statistical inference and a thorough knowledge of the substantive area that provides the source of the medical questions being addressed. Thus, the Department of Biostatistics encourages excellent methodological work that is motivated by sound science that includes but is not limited to active collaborations with other investigators.

Research collaborations for biostatisticians take place both within and across departments in YSPH, as well as with other departments in the School of Medicine and the University at large. Areas of current research include development of general methods

that have wide applicability across different areas of health research, as well as more specific techniques for dealing with the underlying processes that give rise to the data of interest. A broad range of health topics addressed by students in this department include chronic diseases such as cancer, genetic epidemiology, clinical research, and mathematical models for infectious diseases.

Graduates of the doctoral program in Biostatistics are employed in universities throughout the country, as well as in such dedicated research institutions as the National Institutes of Health. In addition, graduates have pursued careers in the pharmaceutical industry, in which they are actively involved in the evaluation of new therapeutic strategies.

REQUIRED COURSE WORK

Students in the department of Biostatistics prepare for their qualifying examination by taking the courses listed below. Course waivers must be recommended by the academic adviser and approved by the DGS.

<i>Course number</i>	<i>Course title</i>	<i>Course units</i>
BIS 525a and b	Seminar in Biostatistics	n/a
BIS 557a	Computational Statistics	1
BIS 567a	Bayesian Statistics	1
BIS 610b	Applied Area Readings for Qualifying Exams	1
BIS 628b	Longitudinal and Multilevel Data Analysis	1
BIS 643b	Theory of Survival Analysis	1
BIS 646b	Nonparametric Statistical Methods and Their Applications	1
BIS 678a	Statistical Consulting	1
BIS 691b	Theory of Generalized Linear Models	1
BIS 695c	Summer Internship in Biostatistical Research	n/a
†CDE 508a	Principles of Epidemiology I	1
†EPH	Breadth of Public Health (in development)	1
*STAT 610a	Statistical Inference	1
*STAT 612a	Linear Models	1

*These courses are offered in the Graduate School of Arts and Sciences.

†Students entering the program with an M.P.H. or relevant graduate degree may be exempt.

In consultation with their academic adviser, students choose a minimum of three additional electives that will best prepare them for dissertation work.

QUALIFYING EXAMINATION

The qualifying examination has two parts, the first being a written examination that demonstrates facility with the use of statistical principles to develop methods of application. The second involves the critical review of the statistical literature, report writing, and oral defense on a specific biomedical topic agreed upon by the candidate and the BIS faculty adviser that will be evaluated by a committee approved by the BIS faculty.

RESEARCH EXPERIENCE

In a number of courses, especially Statistical Consulting (BIS 678a), students gain actual experience with various aspects of research including preparation of a research grant, questionnaire design, preparation of a database for analysis, and analysis and interpretation of real data. In addition, doctoral students can gain research experience by working with faculty members on ongoing research studies prior to initiating dissertation research, which includes but is not limited to BIS 695c. During the summer following the first year of course work, candidates are required to take a research rotation that is approved by the department and communicated to the DGS.

THE DISSERTATION

The department strives for doctoral dissertations that have a strong methodological component motivated by an important health question. Hence, the dissertation should include a methodological advance or a substantial modification of an existing method motivated by a set of data collected to address an important health question. The dissertation must also include the application of the proposed methodology to real data. A fairly routine application of widely available statistical methodology is not acceptable as a dissertation topic. Candidates are expected not only to show a thorough knowledge of the posed health question, but also to demonstrate quantitative skills necessary for the creation and application of novel statistical tools.

Chronic Disease Epidemiology

Epidemiology is the study of disease in populations. Such populations may be groups of people in certain geographic areas, people with a common disease, or people with some suspected risk factor. The Department of Chronic Disease Epidemiology (CDE) has traditionally focused on either chronic or noninfectious diseases, although in recent years the artificiality of this distinction has become obvious and the view has been broadened. A recent thesis, for example concerned the perinatal transmission of HIV/AIDS, and others have examined the viral etiology of cancer.

The department is perhaps best known for its doctoral programs in the epidemiology of aging, cancer, perinatal diseases, genomics, HIV/AIDS, and psychosocial disorders. However, students in the department often work on projects with other departments within YSPH, other departments in the School of Medicine, and other schools within the University. Thus there are numerous opportunities for creating an experientially rich doctoral program.

Graduates from the department's doctoral program are found on the faculties of universities throughout the world, at the highest levels of federal and international research programs, and in leadership positions in numerous private and public foundations and institutions.

REQUIRED COURSE WORK

Students in the CDE department are expected to complete a minimum of seventeen courses from the following courses or their equivalents. Students may choose the traditional Epidemiology concentration or the Social and Behavioral Sciences concentration as noted below. Students must declare their concentration by the end of the first year

with approval from their academic adviser. Students supported by training grants may be subject to additional requirements and should discuss whether there are training-specific requirements with the principal investigator of the grant.

Epidemiology concentration

<i>Course number</i>	<i>Course title</i>	<i>Course units</i>
CDE/EHS 502b	Physiology for Public Health	1
CDE/EMD 508a	Principles of Epidemiology I	1
CDE 516b	Principles of Epidemiology II	1
CDE 523b	Measurement Issues in Chronic Disease Epidemiology	1
CDE 534b	Applied Analytic Methods in Epidemiology	1
CDE 610b	Applied Area Readings for Qualifying Exams	1
CDE 617b	Developing a Research Proposal	1
CDE 619a	Advanced Epidemiologic Research Methods	1
CDE 634b	Advanced Applied Analytic Methods in Epidemiology and Public Health	1
CDE 650a	Introduction to Evidence-Based Medicine and Health Care	1
†EPH	Breadth of Public Health (in development)	1

In consultation with their dissertation adviser, students choose three 600-level course units in Biostatistics as well as three additional electives that will best prepare them for their dissertation research.

†Students entering the program with an M.P.H. or relevant graduate degree may be exempt.

Social and Behavioral Sciences concentration

<i>Course number</i>	<i>Course title</i>	<i>Course units</i>
CDE/EMD 508a	Principles of Epidemiology I	1
CDE 516b	Principles of Epidemiology II	1
CDE 534b	Applied Analytic Methods in Epidemiology	1
CDE 573a	Social and Cultural Factors in Mental Health and Illness	1
CDE 574b	Developing a Health Promotion and Diseases Prevention Intervention	1
CDE 610b	Applied Area Readings for Qualifying Exams	n/a
CDE 617b	Developing a Research Proposal	1
CDE 634b	Advanced Applied Analytic Methods in Epidemiology and Public Health	1
CDE 650a	Introduction to Evidence-Based Medicine and Health Care	1
CDE 676b	Questionnaire Development	1
†EPH	Breadth of Public Health (in development)	1

In consultation with their dissertation adviser, students choose three 600-level course units in Biostatistics as well as three additional electives that will best prepare them for their dissertation research.

†Students entering the program with an M.P.H. or relevant graduate degree may be exempt.

QUALIFYING EXAMINATION

The qualifying examinations in CDE entail a three-part system emphasizing biostatistics, epidemiologic methods, and the student's chosen specialty area.

The examination covering epidemiological methods includes both an in-class and a take-home portion. One faculty member is responsible for coordinating this examination, and the examination content is developed by the overall faculty. The specialty area examination is usually prepared in a tutorial with one or more faculty members in the term prior to the exam.

RESEARCH EXPERIENCE

In a number of courses, students gain actual experience with various aspects of research including preparation of a research grant, questionnaire design, preparation of a database for analysis, and analysis and interpretation of real data. In addition, doctoral students can gain research experience by working with faculty members on ongoing research studies prior to initiating dissertation research.

THE DISSERTATION

For the doctoral dissertation, some candidates will design and develop their own research protocol, collect the data, and conduct appropriate analyses. However, epidemiologic studies are often large, time-consuming, and expensive enterprises that often cannot be realistically completed within the time frame expected for a doctoral dissertation. Consequently, some dissertations often result from “piggy-backing” the dissertation research onto a larger study being conducted by a faculty member. If a student has previously documented experience with data collection, the doctoral dissertation may emphasize the statistical analysis of a data set in such a way as to address a new hypothesis. However the thesis is constructed, the department requires that the research makes a significant contribution to new knowledge in the field of epidemiology. Many dissertations are presented as three or more completed, submitted, or published manuscripts based on the dissertation research.

Environmental Health Sciences

The Environmental Health Sciences (EHS) doctoral program focuses on how environmental agents—physical, chemical, and biological—affect human health, considered within the general framework of epidemiology and public health. Students are skilled in research, assessment, and evaluation of the impact of environmental stressors; they identify potentially adverse environmental agents, assess their exposures, determine their impact on health, and estimate the consequent risk. The Ph.D. emphasizes the preparation of students for scholarly careers in research and teaching.

REQUIRED COURSE WORK

The student's academic adviser determines which core background requirements have been satisfied by previous course work, and which courses the student has to complete successfully. Subsequently, the student and his/her academic adviser form a plan for the student's course work.

Students typically complete the following course requirements:

<i>Course number</i>	<i>Course title</i>	<i>Course units</i>
BIS 505a	Introduction to Statistical Thinking I	1
BIS 505b	Introduction to Statistical Thinking II	1
CDE/EMD 508a	Principles of Epidemiology I	1
EHS/CDE 502b	Physiology for Public Health	1
EHS 503a	Introduction to Toxicology	1
EHS 507a	Environmental Epidemiology	1
EHS 508b	Assessing Exposures to Environmental Stressors	1
EHS 610b	Applied Area Readings for Qualifying Exams	1
†EPH	Breadth of Public Health (in development)	1

†Students entering the program with an M.P.H. or relevant graduate degree may be exempt.

In addition to the above required courses, students elect six courses from the more specialized areas of environmental health (occupational health, risk assessment, etc.). Students supported by training grants may be subject to additional requirements and should discuss whether there are training-specific requirements with the principal investigator of the grant.

The courses listed below are strongly encouraged for students who select Environmental Epidemiology as their area of specialization. In consultation with the student's adviser, alternate courses may be selected.

BIS 623a	Applied Regression Analysis	1
BIS 625a	Categorical Data Analysis	1
CDE 516b	Principles of Epidemiology II	1
CDE 617b	Developing a Research Proposal	1
EHS 545b	Molecular Epidemiology	1
EHS 580b	Environmental Hormones and Human Health	1

Students who select specialization in an area other than Environmental Epidemiology will, together with the academic adviser, identify the specialization area and determine the selection of courses required. These courses may come from other graduate programs in YSPH, as well as from programs in other parts of the University. Students are particularly encouraged to seek additional courses in such subjects as chemistry, cellular and molecular physiology, engineering, forestry, medicine, pharmacology, and physics.

QUALIFYING EXAMINATION

The qualifying examination in EHS tests the student's knowledge in three areas – a specialty and two other areas based upon the student's specialty. The majority of students select Environmental Epidemiology as their area of specialization, and then have Biostatistics as an additional area covered in the comprehensive examinations. Preparation for the specialty area examination usually takes place in a tutorial with one or more faculty members in the term prior to the exam. Specialization in other basic biomedical sciences or departments of the University is also possible.

RESEARCH REQUIREMENTS

During the second term of the first year and the first term of the second year, students work with their academic adviser to participate in ongoing research activities, thereby

gaining an opportunity to learn hands-on techniques in subject areas within environmental health sciences.

THE DISSERTATION

The dissertation for the Ph.D. degree must make an original contribution to the field.

Epidemiology of Microbial Diseases

The goals for doctoral students in the department of Epidemiology of Microbial Diseases (EMD) are to obtain a current theoretical and practical base of epidemiological and microbiological principles, to master research methods, and to apply these skills to investigations of the biology of infectious organisms of public health importance, their transmission, and the epidemiology of the diseases they cause. The approach is multidisciplinary. It includes in-depth ecological, pathogenic, clinical, cellular, immunological, and molecular aspects of infectious diseases, their causative agents, vertebrate hosts, and vectors.

REQUIRED COURSE WORK

Courses in biostatistics, epidemiology, and microbiology are strongly recommended. The specific courses recommended depend on the background of individual students and their stated research interests. An individual program that includes courses, seminars, and laboratory rotations is developed by the student and his or her academic adviser. All students are required to complete three distinct research rotations. These are done in the fall and spring terms and in the summer between the first and second years. Students will be asked to prepare a brief presentation at the end of each rotation. These research rotations (EMD 670) are graded and account for three of the required ten courses. In addition, students are required to complete course work in epidemiology (EMD 508a or CDE 516b) and in Breadth of Public Health (in development). Both courses may be waived if the student enters the program with an M.P.H. or relevant graduate degree.

The following courses are suggested courses that are appropriate for Ph.D. students in EMD. However, other courses in YSPH or in other departments may also be appropriate.

<i>Course number</i>	<i>Course title</i>	<i>Course units</i>
*CBIO 602a	Molecular Cell Biology	1
CDE/EMD 508a	Principles of Epidemiology I	1
CDE 516b	Principles of Epidemiology II	1
EMD 512b	Immunology for Epidemiologists	1
EMD 538a	Quantitative Methods for Infectious Disease Epidemiology	1
EMD 539b	Introduction to Public Health Surveillance	1
EMD/CDE 543a	Global Aspects of Food and Nutrition	1
EMD 547b	Vaccines: Concepts in Biology	1
EMD 548b	Observing Earth from Space	1
EMD 550b/682b	Biology of Insect Disease Vectors	1
EMD 567a	Tackling the Big Three: Malaria, TB, and HIV in Resource-Limited Settings	1
EMD 680a	Advanced Topics in Tropical Parasitic Diseases	1

†F&ES 500a	Landscape Ecology	1
*GENE 734a	Molecular Biology of Animal Viruses	1
HPM 570a	Cost-Effectiveness Analysis and Decision Making	1
*PATH 650b	Cellular and Molecular Biology of Cancer	1

*These courses are offered in the School of Medicine.

†This course is offered in the School of Forestry & Environmental Studies.

RESEARCH REQUIREMENTS

Three research training modules are required of all students, and each term involves a different investigator. These are offered as formal courses, and there will be a brief presentation to the department at the end of each rotation. Each term is graded and recorded on the student's transcript. Investigators act as tutors and monitor the progress of the work, although students are given a certain amount of independence in their work. Rotations are defined broadly, including experiments in the more traditional wet laboratory setting, as well as work in the field and on the computer.

QUALIFYING EXAMINATION

EMD has adopted an oral and written qualifying examination format. The qualifying examination serves as an opportunity for the faculty to evaluate students before their admission to candidacy for the Ph.D. degree. It also serves as a valuable learning experience, where a student has a chance to read critically and in-depth with various faculty members on both the thesis topic and two other topics of interest to the student. The other two topics should ideally be in areas which will expand the dissertation topic to subject matters not covered in the courses. The second component includes writing a research proposal on the proposed dissertation topic. The oral examination takes the form of questions from members of the committee based on the readings and an oral defense of the research proposal.

Detailed information regarding the EMD qualifying examination is available from the EMD representative to the GSEC or the coordinator of graduate student affairs.

Health Policy and Management

The doctoral program in the Department of Health Policy and Management (HPM) is designed to educate individuals to apply knowledge derived from public health and social sciences (biostatistics, epidemiology, political science, organizational behavior and theory, and microeconomics) and to creatively extend such knowledge. Individuals with advanced training in health services research, management, and health policy analysis prepare for research, teaching, or policy careers in both the public and the private sector. The program seeks to educate individuals to engage in activities on the forefront of (1) health services research, (2) organizational theory and management, (3) policy formulation and analysis, and (4) economic theory and its application to health programs.

COURSE WORK

Students in HPM become prepared for their qualifying examinations in the areas of (1) health policy and management, (2) methods and statistics, and (3) an area of depth; students will choose one of three areas of depth—Economic Theory and Application; Organizational Theory and Management; or Political and Policy Analysis.

Faculty advisers and students will seek to select doctoral-level graduate courses for all course work. In cases where the course approved is a master's-level course, HPM faculty will work with instructors to ensure that students are receiving extra doctoral-level content and assignments. This may include different assignments, research papers, additional readings, or other methods to ensure the course provides doctoral-level education. Responsibility for ensuring that this occurs lies with the student and his or her primary adviser, although the adviser will only facilitate the process, not take on responsibility for teaching the material.

Students will complete the following course work or the equivalent of the topic areas covered in these courses. This course listing represents a suggested program of study. With the approval of the academic adviser and DGS, alternative courses that better suit the needs of the student may satisfy the course work requirement. The departmental representative to the GSEC in conjunction with the student's adviser is responsible for determining if core course requirements have been satisfied by previous course work or alternative courses. If so, the student should apply for a course waiver through the Graduate School. HPM students can only waive up to two courses.

Biostatistics/Statistics and Methods (minimum of 4 courses)

<i>Course number</i>	<i>Course title</i>	<i>Course units</i>
BIS 623a	Applied Regression Analysis	1
BIS 625a	Categorical Data Analysis	1
BIS 628b	Longitudinal and Multilevel Data Analysis	1
CDE 580b	Qualitative Research Methods in Public Health	1
*ECON 558a	Econometrics	1
HPM 583b	Methods in Health Services Research	1
*PLSC 500a	Statistics	1
*PLSC 503b	Quantitative Methods	1
*PLSC 504a	Advanced Quantitative Methods	1
*PLSC 508b	Causal Inference and Research Design	1
*SOCY 578a	Logic of Empirical Social Research	1
*SOCY 580a	Introduction to Methods in Quantitative Sociology	1
*SOCY 581b	Intermediate Methods in Quantitative Sociology	1
*SOCY 582a	Statistics III: Advanced Quantitative Analysis for Social Scientists	1

Health Policy and Management (minimum of 4 courses, all with Ph.D. readings)

HPM 510a	Introduction to Health Policy and Health Systems	1
HPM 514b	Health Politics, Governance, and Policy	1
HPM 560b	Health Economics and U.S. Health Policy	1
HPM 561b	Managing Health Care Organizations	1
HPM 570a	Cost-Effectiveness Analysis and Decision Making	1
HPM 587a	Health Care Economics	1
HPM 590b	Addiction, Economics, and Public Policy	1
HPM 597b	Capstone Course in Health Policy	1
†HPM 617a and b	Colloquium in Health Services Research	n/a
‡MGT 879b	Health Care Operations	1

Individualized readings (required)

HPM 610b	Applied Area Readings for Qualifying Exams	n/a
**CDE 508a	Principles of Epidemiology I	1
**EPH	Breadth of Public Health (in development)	1

*These courses are offered in the Graduate School of Arts and Sciences

†HPM 617 is required of all Ph.D. students but does not count toward the total number of required courses.

‡This course is offered in the School of Management.

**Students entering the program with an M.P.H. or relevant graduate degree may be exempt.

AREAS OF DEPTH

Students will take a minimum of four courses relevant to the area of depth chosen.

All students supported by the National Institute on Drug Abuse (NIDA) training program must take one to two courses in substance abuse, behavioral economics, or psychiatric/mental health issues; these may be classes already counted toward other Ph.D. requirements.

Students supported by training grants may be subject to additional requirements and should discuss whether there are training-specific requirements with the Principal Investigator of the grant.

In Economic Theory and Application, students may count ECON 558a as either a statistics/methods class or as an area of depth class, but not both.

Required courses in Economic Theory and Application

*ECON 545a	Microeconomics	1
*ECON 558a	Econometrics	1

In addition, students take two field courses in a concentration area in which they plan to develop expertise. Sets of courses across topics can be selected to meet research interests. Concentration areas are:

Behavioral Economics

*ECON 529b	Behavioral and Neuro-economics	1
*ECON 740b	Experimental Economics Seminar	1
*MGMT 758b	Foundations of Behavioral Economics	1

Labor Economics

*ECON 630a	Labor Economics	1
*ECON 631b	Labor Economics	1
*ECON 776b	Economics of Population	1

Public Finance

*ECON 680a	Public Finance I	1
*ECON 681b	Public Finance II	1

Economic Development

*ECON 730a	Economic Development I	1
*ECON 731b	Economic Development II	1
*ECON 776b	Economics of Population	1
*ECON 797b	Institutions, Politics, and Economic Policy in Developing Countries	1

Required courses in Organizational Theory and Management

*MGMT 730a	Organizations and Management Workshop	1
*MGMT 731b	Organizations and the Environment	1

In addition, students take two courses in the field, selected in consultation with adviser.

Required courses in Political and Policy Analysis

Four courses are required, selected in consultation with adviser. Suggested courses are:

*AMST 685b	Disability: Representation, History, Ethics	1
*ANTH 583b	Health Disparities and Health Equity: Biocultural Perspectives	1
*PLSC 800a	Introduction to American Politics	1
*PLSC 801a	Political Preferences and American Political Behavior	1
*PLSC 802b	Collective Action and Choice	1
*PSYC 647b	Social Science and Institutional Design	1
*SOCY 557b	Political Sociology	1

*These courses are offered in the Graduate School of Arts and Sciences.

QUALIFYING EXAMS

Students will take three qualifying exams, each of which will be graded by two faculty members.

The HPM exam will be written by HPM faculty and will draw on the HPM courses taken by the student.

The methods and statistics exam will be written by faculty to be determined and will reflect the statistics and methods classes taken.

The area of depth exam will be written by HPM faculty with expertise in that area and should reflect the minimum of four courses taken in that area.

RESEARCH REQUIREMENTS

All students are expected to develop their research skills through interaction with HPM faculty around ongoing faculty research.

M.D./PH.D. PROGRAM REQUIREMENTS

All M.D./Ph.D. students must meet with the director of graduate studies in Public Health if they are considering affiliating with PH. Students in this program are expected to meet the guidelines listed below in the time frame outlined. The DGS must approve any variations to these requirements.

Teaching

One term of teaching will be required. If students teach beyond this requirement, they can be compensated. If a student has served as a teaching assistant elsewhere on campus, this experience may be counted toward the requirement.

Rotations/Internships

Students should do two rotations/internships with potential advisers in YSPH. These short-term research projects can be either in a lab or working with a specific faculty member. The purpose of these rotations/internships is to learn lab technique and/or to allow the student time to determine if the faculty member's research directions are compatible with his/her research interests. These rotations/internships are usually done during the summer between the first and second year of School of Medicine course work. In some cases students may need to defer this until the summer after the second year after taking certain courses and/or completing readings so that they possess the background necessary for a successful rotation/internship.

Students must prepare and present a brief summary of their research for faculty and students following each research rotation/internship. This is generally done in a public forum at the end of each term.

Required Course Work

M.D./Ph.D. students are generally expected to take the same courses as traditional Ph.D. students. Departmental requirements may vary; therefore, students should confer with the DGS and/or their Ph.D. adviser.

Timeline for Qualifying Exam

Students generally will take School of Medicine courses in years one and two, then PH doctoral course work in years three and four (all or part of year three). The qualifying exam is generally taken in the summer following the fourth year.

Prospectus Timeline

Students are encouraged to develop their prospectus during their third and fourth years of study, while taking courses in YSPH. Upon completion of the qualifying exam, students should focus entirely on completion of the prospectus, which should be submitted no later than six months after the completion of the qualifying exams.

Course Descriptions

Courses designated “a” meet in the fall term only.

Courses designated “b” meet in the spring term only.

Courses designated “a and b” are yearlong courses.

Courses designated “c” meet in the summer term.

Bracketed courses are not offered in the current academic year.

BIOSTATISTICS

BIS 505a, Introduction to Statistical Thinking I This course provides an introduction to the use of statistics in the fields of epidemiology and public health. Topics include descriptive statistics, probability distributions, parameter estimation, and hypothesis testing, as well as an introduction to sampling and simple linear regression. Statistical analysis using the Statistical Analysis Systems (SAS) software and development of communication skills relative to the presentation of these analyses are introduced. E. Claus

BIS 505b, Introduction to Statistical Thinking II This continuation of BIS 505a covers multiple regression, analysis of variance, nonparametric tests, survival analysis, poisson regression, and logistic regression. The course concludes with a review of commonly used statistical methods. As in the first term, the Statistical Analysis Systems (SAS) software package is used for statistical analysis. Prerequisite: BIS 505a. D. Zelterman

[BIS 511a, GIS Applications in Epidemiology and Public Health The study of epidemiology often seeks to determine associations between exposure risk and disease that are spatially dependent. Geographic information systems (GIS) are modern computer-based tools for the capture, storage, analysis, and display of spatial information. GIS technologies are just beginning to be used for public health planning and decision making. Public health applications of GIS provide cost-effective methods for evaluation interventions and modeling future trends, and also provide a visual tool for data exploration. This class teaches the technical and design aspects of implementing a GIS project in public health and provides students with basic tools for using GIS. Examples are given to introduce a variety of applications in the field of epidemiology. Not offered in 2015–2016]

BIS 515c, Accelerated Biostatistics This intensive seven-week summer course provides a comprehensive introduction to the use of statistics in the fields of epidemiology, public health, and clinical research. Students gain experience conducting and interpreting a broad range of statistical analyses. Topics include descriptive statistics, probability distributions, parameter estimation, hypothesis testing, sample size estimation, analysis of variance, nonparametric tests, and linear regression. Through weekly computer laboratory sessions, students become familiar with the SAS statistical software package. Enrollment limited to students in the Advanced Professional M.P.H. and Accelerated M.B.A./M.P.H. programs; not open to students in the traditional two-year M.P.H. program or the five-year B.A.-B.S./M.P.H. program. M. Ciarleglio

BIS 525a and b, Seminar in Biostatistics Faculty and invited speakers present and discuss current research. F. Crawford, J. Warren

BIS 538b, Survey Sampling: Methods and Management This course reviews the major sampling plans: simple stratified, systematic, and cluster random sampling. The uses of weighted data and ratio estimation are discussed. The course emphasizes application of methodology, including use of SUDAAN. Prerequisite: BIS 505b or equivalent. D. Esserman

BIS 540a, Fundamentals of Clinical Trials This course addresses issues related to the design, conduct, and analysis of clinical trials. Topics include protocol development, examination and selection of appropriate experimental design, methods of randomization, sample size determination, appropriate methods of data analysis including time-to-event (possibly censored) data, and interim monitoring and ethical issues. Prerequisites: BIS 505a or equivalent and second-year status. R. Makuch

BIS 557a, Computational Statistics This is a graduate-level course in the theory and practice of statistical computing. The goal of the course is to develop analytical and computational skills that will enable students to solve computational challenges in their own research. The course covers basic mathematical and statistical techniques that statisticians use when analyzing data and models for which there is no ready-made software. Every component of the course covers theoretical concepts, implementation details, and applications to real data or common statistical models that students will encounter in practice. This course is not an introduction to programming, nor is it a survey of software packages for doing statistics; the course covers fundamentals of using the R language, but students are expected to be already familiar with basic concepts in programming. F. Crawford

BIS 561b, Advanced Topics and Case Studies in Multicenter Clinical Trials This course addresses advanced issues related to the design, conduct, monitoring, and analysis of multicenter randomized clinical trials. Topics include organizational, regulatory, and human rights issues; an overview of design strategies; advanced topics in sample size estimation and monitoring; data management and quality assurance procedures; cost-effectiveness and quality of life; and case studies of vaccine trials, factorial trials, primary and secondary prevention trials, large simple trials, strategy trials, and cost-effectiveness. The case studies include many of the classical and landmark clinical trials, such as the polio vaccine field trial, Physicians Health Study, and the trials of AZT for the treatment of AIDS. Prerequisite: BIS 505a. P. Peduzzi, M. Ciarleglio

BIS 567a, Bayesian Statistics Bayesian inference is a method of statistical inference in which prior beliefs for model parameters can be incorporated into an analysis and updated once data are observed. This course is designed to provide an introduction to basic aspects of Bayesian data analysis including conceptual and computational methods. Broad major topics include Bayes's theorem, prior distributions, posterior distributions, predictive distributions, and Markov chain Monte Carlo sampling methods. We begin by motivating the use of Bayesian methods, discussing prior distribution choices in common single parameter models, and summarizing posterior distributions in these settings. Next, we introduce computational methods needed to study multi-parameter models. R software will most often be used. We then apply these methods to more complex modeling settings including linear, generalized linear, and hierarchical models. Discussion of model comparisons and adequacy is also presented. J. Warren

BIS 575b, Introduction to Regulatory Affairs This course provides students with an introduction to regulatory affairs science, as these issues apply to the regulation of food, pharmaceuticals, and medical and diagnostic devices. The course covers a broad range of specialties that focus on issues including legal underpinnings of the regulatory process, compliance, phases of clinical testing and regulatory milestones, clinical trials design and monitoring, quality assurance, post-marketing study design in response to regulatory and other needs, and post-marketing risk management. The complexities of this process require awareness of leadership and change management skills. Topics to be discussed include: (1) the nature and scope of the International Conference on Harmonization, and its guidelines for regulatory affairs in the global environment; (2) drug development, the FDA, and principles of regulatory affairs in this environment; (3) the practice of global regulatory affairs from an industry perspective; (4) description/structure/issues of current special importance to the U.S. FDA; (5) historical background and FDA jurisdiction of food and drug law; (6) the drug development process including specification of the important milestone meetings with the FDA; (7) risk analysis and approaches to its evaluation; (8) use of Bayesian statistics in medical device evaluation, a new approach; (9) use of data monitoring committees and other statistical methods for regulatory compliance; (10) developments in leadership and change management; and (11) food quality assurance including risk analysis/compliance/enforcement. Through course participation, students also have opportunities to meet informally with faculty and outside speakers to explore additional regulatory issues of current interest. R. Makuch

BIS 600a,b, Independent Study or Directed Readings Independent study or directed readings on a specific research topic agreed upon by faculty and student. By arrangement with faculty.

BIS 610b, Applied Area Readings for Qualifying Exams Required of BIS Ph.D. students, in preparation for qualifying exams. Readings arranged with specific faculty in related research area. By arrangement with faculty.

BIS 623a, Applied Regression Analysis This course covers linear regression, estimation, and testing hypotheses in multivariate regression, regression diagnostics, analysis of variance, and adjusting for covariates. Emphasis is on the application of methods. SAS software is used throughout the course. Prerequisite: BIS 505b or equivalent. B. Zhou

BIS 625a, Categorical Data Analysis This course presents methods for analyzing categorical data in public health, epidemiology, and medicine. Topics include discrete distributions, log-linear models, and logistic regression. Emphasis is placed on the application of the methods and the interpretation of results by applying the techniques to a variety of data sets. Prerequisite: BIS 505b or equivalent. Z. Wang

[BIS 626a, Gerontologic Biostatistics: Statistical Methods for Clinical Research with Older Study Participants and for Basic Aging Research This course addresses the statistical issues that arise in the design, conduct, analysis, and interpretation of clinical research with older study participants and of basic aging research. Special attention is given to the conceptual understanding of the challenges involved in aging research and to the practical application of methods for meeting those challenges. Topics include issues

such as multicomponent intervention clinical trials, triggered sampling observational designs, and transition modeling. All topics are illustrated with case studies from the Yale Program on Aging. Prerequisite: BIS 505a/b. Not offered in 2015–2016]

BIS 628b, Longitudinal and Multilevel Data Analysis This course covers methods for analyzing data in which repeated measures have been obtained for individuals over time. Different methods are discussed to handle both continuous and discrete longitudinal response data. Both subject-specific and population averaged approaches are covered (with particular reference to capturing the heterogeneity between different individuals). Some of the approaches covered include linear, nonlinear, and generalized mixed effects models, as well as generalized estimating equations. The course also covers exploratory methods, approaches for handling missing data, and possibly transition models and advanced topics such as multivariate longitudinal responses, nonparametric longitudinal responses, the joint consideration of longitudinal and survival data, and the joint consideration of longitudinal and spatial data. Emphasis is placed on applying the methods, understanding underlying assumptions, and interpreting results. Both SAS and S-Plus software are used throughout the course. Prerequisites: BIS 623a and 625a. H. Lin

BIS 630b, Applied Survival Analysis This course demonstrates statistical methods for analyzing and interpreting time-to-failure data. The techniques described include the construction and analysis of failure rates, survival curves, significant tests for comparing survival curves, and semi-parametric models for the analysis of time-to-failure data including the proportional hazards model. Skills for using statistical software to perform the analyses are developed. In addition, study design is covered, including sample size and power calculations. Prerequisites: BIS 505a and 505b; and BIS 623a or 625a. M. Ciarleglio

BIS 639b, Descriptive Analysis of Public Health Data The analysis of publically available health data provides insight into ways of exploring disease etiology, especially when considering temporal and spatial trends in disease rates and corresponding changes that are related to putative etiologic agents. Age-period-cohort models have been an effective analytical strategy for exploring disease trends and generating hypotheses for putative risk factors to be explored using analytical studies. This course introduces methodology for extracting disease rates from public sources and using them to analyze temporal-spatial trends for disease. It also uses survey data on exposure to putative risk factors and results from analytical studies to quantify the extent that known etiology can account for disease trends. This information is also used to assess the impact of public health policy on disease control. Prerequisites: BIS 505a and 505b; and BIS 623a or 625a. T. Holford

[**BIS 643b, Theory of Survival Analysis** This course presents the statistical theory underlying survival analysis. It covers different models of censoring and the three major approaches to analyzing this type of data: parametric, nonparametric, and semiparametric methods. The application of this theory through some exemplary data sets is also presented. Prerequisites: STAT 541a and 542b. Offered every other year. Not offered in 2015–2016]

BIS 645b/CB&B 647b/GENE 645b, Statistical Methods in Human Genetics Probability modeling and statistical methodology for the analysis of human genetics data are

presented. Topics include population genetics, single locus and polygenic inheritance, linkage analysis, genome-wide association studies, quantitative trait locus analysis, rare variant analysis, and genetic risk predictions. Prerequisites: BIS 505a and b, or equivalent; and permission of the instructor. Offered every other year. H. Zhao

BIS 646b, Nonparametric Statistical Methods and Their Applications Nonparametric statistical procedures including recursive partitioning techniques, splines, bootstrap, and other sample reuse methods are introduced. Some of the supporting theory for these methods is proven rigorously, but some is described heuristically. Advantages and disadvantages of these methods are illustrated by medical and epidemiological studies. Students may be required to compare these methods with parametric methods when analyzing data sets. Familiarity with basic statistical theory and computer languages is assumed. Prerequisites: STAT 541a and 542b. H. Zhang

[**BIS 648a, Statistical Methods for Sequence Data Analysis** The availability of massive amounts of sequencing data has generated both great promises and significant challenges for biological and biomedical researchers. This course focuses on the statistical and computational issues arising from the analysis of these data. Topics to be covered include data pre-processing, allele calling, RNA-seq analysis, ChIP-seq analysis, and metagenomics data analysis. The course combines methodology expositions with real data examples to illustrate the discussed methods. Not offered in 2015–2016]

BIS 650a,b, Master's Thesis Research The thesis is the culmination of the student's educational experience in Biostatistics. Students work with faculty advisers in designing their project and writing the thesis. Detailed guidelines for the thesis are outlined in Appendix II. H. Zhao

[**BIS 651b, Spatial Statistics in Public Health** Statistical methods for the analysis of spatial data that arise from health studies are developed in order to account for spatially correlated outcomes. Techniques to be discussed include methodology for continuous responses such as inverse distance weighting and Kriging. Bayesian models for smoothing disease risk maps are derived. Environmental exposure models are developed. In addition, spatial/temporal models are discussed that allow the analysis of both sources of correlation. Techniques are illustrated using data from ongoing studies. Prerequisite: STAT 541a and 542b. Not offered in 2015–2016]

BIS 678a, Statistical Consulting This class offers the chance for students to gain experience and practical knowledge working as a biostatistician in a real-world setting. Students collaborate with an investigator, designing and implementing statistical approaches to further clinical research efforts under the supervision of an instructor. This class prepares students for further, unsupervised collaborations in their careers as biostatisticians with an emphasis on developing effective oral and written communication skills. Prerequisites: BIS 623a and BIS 625a; open to second-year Biostatistics doctoral and M.S. students, or by permission of the instructors. P. Peduzzi, M. Kane, D. Esserman

BIS 679a, Advanced Statistical Programming in SAS and R This class offers students the chance to build on basic SAS and R programming skills. Half of the term is spent working with SAS learning how to create arrays, format data, merge and subset data from

multiple sources, transpose data, and write and work with macros. The second half of the term is spent working with R learning how to work with data, program functions, write simulation code using loops, and bootstrap. Prerequisites: BIS 505a and basic knowledge of both SAS and R. D. Esserman

BIS 681b, Statistical Consulting Lab This class offers the opportunity for students to gain experience and practical knowledge by working as a practicing biostatistician in a “real-world” setting, a statistical consulting lab supervised by instructors in the Department of Biostatistics. The course is primarily aimed at having graduate students in Biostatistics provide statistical consultation to other graduate students at the Yale School of Public Health and Yale School of Medicine who are working on their thesis/research projects: i.e., students helping students. Prerequisites: BIS 623a, BIS 625a, and BIS 678a; open to second-year Biostatistics doctoral and M.S. students, or by permission of the instructors. P. Peduzzi, M. Kane, D. Esserman

BIS 691b, Theory of Generalized Linear Models This course considers a class of statistical models that generalize the linear model through the link functions of response mean. Major varieties of GLMs including models for Gaussian, Gamma, binomial, un/ordered polynomial, and Poisson responses are discussed. Goodness of fit of the models and overdispersion are considered. Extensions to correlated responses are examined through the approaches of quasi-likelihood and generalized estimating equation. The course covers both theoretical and applied aspects of data analytic issues arising from practice. Prerequisites: STAT 542b, BIS 623a, and some knowledge of matrix calculation. S. Ma

[**BIS 692b/CB&B 645b/STAT 645b, Statistical Methods in Genetics and Bioinformatics** Introduction to problems, algorithms, and data analysis approaches in computational biology and bioinformatics; stochastic modeling and statistical methods applied to problems such as mapping disease-associated genes, analyzing gene expression microarray data, sequence alignment, and SNP analysis. Statistical methods include maximum likelihood, EM, Bayesian inference, Markov chain Monte Carlo, and some methods of classification and clustering; models include hidden Markov models, Bayesian networks, and the coalescent. The limitations of current models, and the future opportunities for model building, are critically addressed. Prerequisite: STAT 538a, 542b, or 661a. Prior knowledge of biology is not required, but some interest in the subject and a willingness to carry out calculations using R is assumed. Not offered in 2015–2016]

BIS 695c, Summer Internship in Biostatistical Research The purpose of this course is to provide students with the opportunity of gaining practical experience in the analysis and the development of biostatistical methods as part of a health sciences research team including medicine, public health, pharmaceutical industry, or health care delivery. This experience provides a basis for developing a dissertation thesis proposal that has practical significance for addressing important scientific questions. Students work with a biostatistics faculty mentor to select a suitable placement for the summer intern, and a one-page description of the plans will be submitted to the instructor at least three weeks prior to starting the program, for approval within two weeks. Upon completion of the internship, a written report of the work must be submitted to the instructor no later than October 1. Prerequisite: completion of one year of the Ph.D. or M.S. program or permission of the instructor. H. Zhao

CHRONIC DISEASE EPIDEMIOLOGY

CDE 502b/EHS 502b, Physiology for Public Health The objective of this course is to provide a comprehensive working knowledge of the primary physiologic and metabolic systems that respond to environmental stressors. A major emphasis of the course is to analyze potential health consequences of these stressors: examining vulnerabilities affected by age, chronic disease, and sedentary lifestyle, as well as protection afforded by healthy lifestyle factors. C. Yeckel

CDE 505a/PSYC 657a, Social and Behavioral Foundations of Health This course provides students with an introduction to social and behavioral science issues that influence patterns of health and health care delivery. The focus is on the integration of biomedical, social, psychological, and behavioral factors that must be taken into consideration when public health initiatives are developed and implemented. The course emphasizes the integration of research from the social and behavioral sciences with epidemiology and biomedical sciences. B. Levy

CDE 505c, Accelerated Social and Behavioral Foundations of Health This intensive seven-week summer course provides students with an introduction to social and behavioral science issues that influence patterns of health and health care delivery. The focus is on the integration of biomedical, social, psychological, and behavioral factors that must be taken into consideration when public health initiatives are developed and implemented. This course emphasizes the integration of research from the social and behavioral sciences with epidemiology and biomedical sciences. Not open to students in the traditional two-year M.P.H. program. J. Ickovics

CDE 508a/EMD 508a, Principles of Epidemiology I This course presents an introduction to epidemiologic definitions, concepts, and methods. Topics include history of epidemiology, descriptive epidemiology, measurement of disease occurrence and association, study design (ecologic, cross-sectional, case-control studies, cohort, and intervention), surveillance, measurement validity and screening, random variation and precision, bias, confounding, effect modification, and causality. The course also teaches skills for quantitative problem solving, and the understanding of epidemiologic concepts in the published literature. L. Niccolai

CDE 515c, Accelerated Epidemiology This intensive seven-week summer course provides a comprehensive overview of epidemiologic concepts and methods. Topics include measurements of disease frequency and association, study design (including randomized and non-randomized controlled trials, cohort studies, case-control studies, cross-sectional studies, and ecologic studies), screening principles, reliability and validity, bias, confounding, and effect modification. After completing this course, students are able to calculate and interpret epidemiologic parameters, identify the strengths and weaknesses of various study designs, and apply the principles and methods of epidemiology to the design and analysis of new studies. Not open to students in the traditional two-year M.P.H. program. M. Desai

CDE 516b, Principles of Epidemiology II This is an intermediate-level course on epidemiologic principles and methods. The course covers bias, introduction to multivariable

analysis for confounder control and assessment of effect modification, indirect standardization, matching, residual confounding, survival analysis, randomized controlled trials including cluster-randomized trials, multiplicity and subgroup analysis, sample size and power, meta-analysis, screening, genetic association studies, use of biomarkers in epidemiology, and epidemic investigation. Through lectures, class discussion, readings from the peer-reviewed literature in both chronic and infectious disease epidemiology, and homework assignments, students learn to (1) evaluate the scientific merit and feasibility of epidemiologic study designs; (2) review, critique, and evaluate epidemiologic reports and research articles; (3) perform epidemiologic calculations; and (4) draw appropriate inferences from epidemiologic data, all at the intermediate level. Prerequisites: CDE/EMD 508a and BIS 505a. F. Shebl

CDE 520b/EHS 520b, Case-Based Learning for Genetic and Environmental Diseases

This course covers the basic concepts, methodology, and up-to-date research approaches central to understanding genetic and environmental causes of human diseases. Lectures are based on comprehensive illustrations with several historical landmark studies; real-life stories, cartoons, and videos are used throughout. Students leave the class with an appreciation of genetics and an understanding of how to appropriately use the study designs, analyses, and interpretations to discover disease susceptibility genes. In addition, students learn how epigenetics affects disease presentation. Critically, students are expected to equip themselves to tackle the causes of the disease of their own interest. Participation in in-class as well as out-of-class discussions, take-home quiz sets, hands-on exercises with real data, and a presentation are the criteria for the final grade. No prerequisites. J. Hoh

CDE 523b, Measurement Issues in Chronic Disease Epidemiology This course addresses the measurement issues in chronic disease epidemiology from a practical perspective. The first part of the course covers the use and limitations of currently available techniques for measuring exposure to a number of etiologic factors such as diet, alcohol, tobacco, physical activity, psychological stress, and environmental exposures. The latter part of the course focuses on the measurement of outcome for some of the major chronic diseases, along with some practical considerations involved in conducting chronic disease epidemiology research. Prerequisite: CDE/EMD 508a. J. Lichtman

CDE 525a and b, Seminar in Chronic Disease Epidemiology & Social and Behavioral Sciences This seminar is conducted in two series: once a month it focuses on speakers and subjects of particular relevance to CDE students, and once a month it focuses on speakers and subjects of particular relevance to SBS students. Students are introduced to research activities of the department's faculty members, with invited outside investigators to complete the schedule. The CDE series is required for first-year CDE students. The SBS series is required for first-year SBS students. Cross-attendance is optional. S. Wang, J. Pachankis

[CDE 531a/PSYC 664a, Health and Aging This course explores the ways psychosocial and biological factors influence aging health. Topics include interventions to improve mental and physical health; effects of ageism on health; racial and gender health disparities in later life; and how health policy can best adapt to the growing aging population.

Students have the opportunity to engage in discussions and to develop a research proposal on a topic of interest. Not offered in 2015–2016]

CDE 532b, Epidemiology of Cancer This course applies epidemiologic methods to the study of cancer etiology and prevention. Introductory sessions cover cancer biology, carcinogenesis, cancer incidence, and mortality rates in the United States, and international variation in cancer rates. The course then focuses on risk factors for cancer (including tobacco, alcohol, hormonal factors, diet, radiation, and obesity/physical activity) and on major cancer sites (including colon, breast, and prostate). Emphasis is placed on critical reading of the literature. Prerequisite: CDE/EMD 508a. B. Cartmel

CDE 533b, Topics in Perinatal Epidemiology Pregnancy, delivery, and reproduction provide the course's organizing focus. The current perinatal epidemiologic literature is critically reviewed from a methodological perspective. Topics studied are based on the current scientific literature in the field and may include issues such as infertility, miscarriage, fetal growth retardation, preterm labor and delivery, aspects of prenatal care, congenital malformations, perinatal risks for cancer and other chronic diseases, SIDS, and infant mortality. Students actively participate in a seminar format and develop an understanding of what evidence is needed to establish causal relationships in this specialty. Implications of research findings for public health policy, individual decision making, and future studies are considered. A.M. Jukic

CDE 534b, Applied Analytic Methods in Epidemiology This computer lab-based course provides students with a comprehensive overview of data management and data analysis techniques. The SAS statistical software program is used. Students learn how to create and manipulate data sets and variables using SAS; identify appropriate statistical tests and modeling approaches to evaluate epidemiologic associations; and perform a broad array of univariate, bivariate, and multivariate analyses using SAS and interpret the results. Prerequisites: BIS 505a, CDE/EMD 508a, and students must have taken or currently be taking BIS 505b (or, for Advanced Professional M.P.H. students, successful completion of BIS 515c and CDE 515c). M. Desai

CDE 535b, Epidemiology of Heart Disease and Stroke Heart disease and stroke are among the leading causes of death and disability among industrialized nations. This course introduces students to the major categories of cerebrovascular and cardiovascular disease. Students are challenged to think about how individual diseases contribute to the epidemic of vascular disease in the United States. In this course, students learn basic principles about the rates of disease, risk factors, clinical trial results, and outcomes of heart disease and stroke. Through the analysis of actual studies, students apply basic epidemiology to critically evaluate current literature and topics in this field. Sessions include a clinical overview of a specific disease or risk factor, as well as highly interactive discussion of a specific epidemiologic topic or principle. Students are encouraged to develop their own solutions to current gaps in the epidemiologic literature. J. Lichtman

CDE 537b, Social and Interpersonal Influences on Health Social relationships, such as friends, family, romantic partners, neighbors, and coworkers, are an important part of our lives. They are the targets of our behaviors, for example, when we help, love, fight,

and discriminate against others. They are the basis of our feelings of status and self-esteem and why we experience the majority of our emotions. Importantly, social relationships have strong influences on our mental and physical health. The purpose of this class is to learn about different ways of conceiving of our social environment, and learning how these social factors can contribute to our mental and physical health. We critically review the literature that examines the associations between social factors and mental and physical health. We address several social concepts, and in each case discuss how they “get under the skin” to influence health. Required of SBS students. Open to others with a background in social and behavioral sciences and permission of the instructor. J. Monin

CDE 541a, Community Health Program Evaluation This course develops students’ skills in designing program evaluations for public health programs, including non-governmental and governmental agencies in the United States and abroad. Students learn about different types of summative and formative evaluation models and tools for assessment. The course content is based on an ecological framework, principles of public health ethics, a philosophy of problem-based learning, and critiques of evaluation case studies. Students write evaluation plans for a specific existing public health program. Students may also work as a team with a local community health agency reviewing their evaluation plans and providing guidance on developing a program evaluation plan for one of the agency’s public health programs. D. Stevens

[**CDE 543a/EMD 543a, Global Aspects of Food and Nutrition** The course presents a core topic in global health and development that is at the intersection of science, society, and policy. The course familiarizes students with leading approaches to analyzing the causes of malnutrition in countries around the world and to designing and evaluating nutrition interventions. It covers micronutrient and macronutrient deficiencies; approaches to reducing malnutrition; the cultural, economic, environmental, agricultural, and policy context within which malnutrition exists; and the relationships between common infections and nutritional status. Not offered in 2015–2016]

CDE 545b, Health Disparities by Race and Social Class: Application to Chronic Disease Epidemiology One of four overarching goals of Healthy People 2020 is to “achieve health equity, eliminate disparities, and improve the health of all groups.” This course explores disparities in the chronic diseases that contribute disproportionately to ill health, resource utilization, reduced quality of life, and mortality. Taking a life course perspective as we explore disparities across the spectrum of chronic diseases, we focus on differences in health between diverse racial/ethnic and/or socioeconomic groups, primarily in the United States. The primary focus of this course is on understanding the determinants and consequences of health disparities, learning to critically evaluate health disparities research, and thinking creatively about elimination strategies. A sound foundation in epidemiological methods and a working knowledge of the major chronic diseases are required. Prerequisites: CDE/EMD 508a, and CDE 505a or 571b. B. Jones

CDE 562a, Nutrition and Chronic Disease This course provides students with a scientific basis for understanding the role of nutrition and specific nutrients in the etiology, prevention, and management of chronic diseases. Nutrition and cancer are particularly emphasized. Other topics addressed include cardiovascular diseases, osteoporosis,

obesity, diabetes mellitus, and aging. Implications for federal nutrition policy (dietary guidelines, dietary supplement regulations, food labeling, etc.) are discussed. Prerequisites: biology, biochemistry, and physiology helpful. L. Ferrucci

CDE 568b, Public Health Communications This course is an introduction to the theory, design, and implementation of health communication efforts. The class time is a highly interactive seminar using role playing and case studies—whenever possible incorporating the students' experiences and global public health events such as the recent Ebola outbreak if they are currently in the news. The goal is to enhance students' abilities in message design, crisis response, and communication of scientific information in nontechnical language to the general public. The work focuses on subjects such as the choice of media channels with a special emphasis on new media, understanding and including the intended audience in any communications, as well as prior research and post-evaluation of communication efforts. R. Bazell

CDE 572a, Obesity Prevention and Lifestyle Interventions This course reviews the methods and evaluation of obesity prevention and lifestyle interventions conducted in multiple settings (e.g., individual, family, and community settings, as well as policy-level interventions). Topics include physical activity, nutrition, and weight-loss interventions in various populations (children, adults, those who are healthy, and those with chronic diseases). The course combines didactic presentations, discussion, and a comprehensive review of a particular lifestyle intervention by students. This course is intended to increase the student's skills in evaluating and conducting obesity prevention and lifestyle interventions. M. Irwin

CDE 573a, Social and Cultural Factors in Mental Health and Illness This course provides an introduction to mental health and illness with a focus on the complex interplay between risk and protective factors and social and cultural influences on mental health status. We examine the role of social and cultural factors in the etiology, course, and treatment of substance misuse; depressive, anxiety, and psychotic disorders; and some of the severe behavioral disorders of childhood. The social consequences of mental illness such as stigma, isolation, and barriers to care are explored, and their impact on access to care and recovery considered. The effectiveness of the current system of services and the role of public health and public health professionals in mental health promotion are discussed. M. Smith

CDE 574b, Developing a Health Promotion and Disease Prevention Intervention The primary objective of the course is to gain experience in intervention research by developing a health promotion and disease prevention intervention. Students choose a health problem (e.g., physical inactivity, smoking, HIV risk) and develop an intervention focused on favorably changing the determinants and behavior that influence the health problem. The course emphasizes transferring concepts from the abstract to the concrete. Students develop an intervention manual consisting of actual intervention materials and methods that specifically outline how the intervention will be designed, conducted, evaluated, and disseminated. Throughout the course, students participate in a peer review process to evaluate and give feedback for each section of the intervention manual. T. Kershaw

[CDE 577b, Interdisciplinary Research Methods in the Social and Behavioral Sciences

In this course, students learn about social and behavioral health research methods through lectures, reading assignments, group discussions, class activities, and research projects. During the lecture portion of the class, students learn how to translate abstract ideas into testable hypotheses and how best to choose among a wide range of research methods and procedures. Class demonstrations, group discussions, and activities help students learn about research methods to address questions about how social and behavioral factors are associated with health. To illustrate the different types of research methods that can be used, we focus on social relationships, emotions, and health for group discussions. For individual projects, however, students are free to examine any psychosocial and behavioral question of interest to them. Not offered in 2015–2016]

CDE 580b, Qualitative Research Methods in Public Health This is a course about doing qualitative social research in public health. The course, which has both theoretical and practical components, introduces students to various epistemological, philosophical, and ethical considerations that are involved with qualitative research methods and the practice of social science research more generally. Additionally, students gain hands-on experience with some of the strategies and techniques that are needed to conduct qualitative research. D. Keene

CDE 581a, Stigma and Health This course engages students in conceptualizing stigma as a fundamental cause of adverse health. After reviewing conceptual models of stigma, students examine the multiple mechanisms—both structural and individual—through which stigma compromises the health of a large proportion of U.S. and global populations. Given the relevance of identity and stress to the study of stigma and health, the empirical platform of the course is complemented by considering the relevance of conceptual models of identity, intersectionality, and minority stress. The course reviews social/behavioral and epidemiological methods for studying stigma. Students compare individual- and structural-level interventions to reduce both stigma at its source and its downstream impact on individual health. Class content is organized around themes that cut across all stigmatized conditions and identities. However, students devote course assignments to individual stigmas of their choice. Therefore, students can expect to explain stigma as a predicament that affects nearly all individuals at some point in the life course while developing expertise in one or two stigmas that are particularly relevant to their interests. J. Pachankis

[CDE 582a, Regulatory and Scientific Issues Relating to Tobacco Use This course provides students with an understanding of nicotine dependence and tobacco addiction and related research methods. Specific topics include animal models of nicotine dependence; genetics of tobacco addiction; imaging methods for tobacco addiction; measurement of tobacco addiction, including self-report, biomarkers; the effects of various ingredients (additives, flavors) on palatability, inhalability, and addictiveness; interventions for addiction reduction; smoking initiation and progression in adolescents; the role of public health policy in addiction reduction; and training in research methods. Not offered in 2015–2016]

CDE 585a/GLBL 529a/LAW 20568, Sexuality, Health, and Human Rights The course explores the application of human rights perspectives and practices to issues in regard to sexuality and health. It addresses the necessity – and complexity – of adding nuanced rights perspectives to programming and advocacy on sexual health. Through reading, interactive discussion, paper presentation, and occasional outside speakers, students learn the tools and implications of applying rights to a range of sexuality and health-related topics. The overall goal is twofold: to engage students in the world of global sexual health and rights policy making as a field of social justice and public health action; and to introduce them to conceptual tools that can inform advocacy and policy formation and evaluation. A. Miller

CDE 594a, Maternal-Child Public Health Nutrition This course examines how nutrition knowledge gets translated into evidence-informed maternal-child food and nutrition programs and policies. Using multisectorial and interdisciplinary case-study examples, the course highlights (a) socioeconomic, cultural, public health, and biomedical forces that determine maternal-child nutrition well-being; and (b) how this understanding can help shape effective programs and policies capable of improving food and nutrition security of women and children. Topics include maternal-child nutrition programs, food assistance and conditional cash-transfer programs, and the Dietary Guidelines for Americans. Prerequisites: CDE 508a and BIS 505a. R. Pérez-Escamilla

CDE 596b/LAW 21416, Global Health Justice Practicum This course fuses didactic and experiential learning on critical topics at the intersection of public health, rights, and justice in the twenty-first century. Students have the opportunity to explore analytic and practical frameworks that engage a diverse range of legal frameworks and processes that act as key mediators of health, including producing or responding to health disparities in the United States and worldwide. Readings and project approaches draw from legal, public health, historical, anthropological, and other fields to introduce students to the multiple lenses through which health issues can be tackled, and to build their competence to work with colleagues in other disciplines around such interventions. Enrollment limited to twelve. A. Kapczynski, A. Miller, G. Gonsalves

CDE 597a, Genetic Concepts in Public Health This course is geared toward public health students with an interest in genetics, but no previous genetics course work. The course spends a significant amount of time dedicated to introductory genetic principles from the central dogma of DNA-RNA-protein to how the human genome is organized. The course continues with discussions specifically related to disease gene mapping and finally covers topics including gene-environment interactions, genetic screening, and ethics. Students leave the course with a basic understanding of genetic concepts and how these are applied in a public health setting. The course prepares interested students for more advanced course work in genetic epidemiology, statistical genetics, or human genetics. A. DeWan

CDE 600a,b, Independent Study or Directed Readings Independent study or directed readings on a specific research topic agreed upon by faculty and student. By arrangement with faculty.

CDE 610b, Applied Area Readings for Qualifying Exams Required of CDE Ph.D. students, in preparation for qualifying exams. Readings arranged with specific faculty in related research area. By arrangement with faculty.

CDE 617b, Developing a Research Proposal Each student develops a research grant proposal individually or working with another student. This includes the development of a research question, specific aims, study hypotheses, reviewing and summarizing relevant scientific literature, choosing a study design, and developing a data collection and analysis strategy. Students meet with the instructor and submit drafts of sections of the grant proposal throughout the course and make interim presentations to the class on their progress. During the final weeks of the course, each grant proposal is reviewed for feedback. Students then revise their proposal based on the reviewers' comments and resubmit the revised proposal to the instructor for a final grade. Prerequisite: BIS 505a, BIS 505b (can be taken concurrently), CDE 516b (can be taken concurrently), doctoral status, or permission of the instructor. Auditors are not allowed. X. Ma

CDE 619a, Advanced Epidemiologic Research Methods This advanced course focuses on quantitative issues and techniques relevant to the design and analysis of observational epidemiologic studies. Starting with formal definitions of the commonly used epidemiologic parameters, and assuming a working knowledge of ANOVA and linear regression, the course covers analyses based on various related types of regression, e.g., logistic, Poisson, Cox, etc. The GLIM and PECAN computer programs are described and used throughout. Students analyze and discuss data sets of generally increasing complexity. Prerequisites: BIS 505a, 505b, doctoral status, or permission of the instructor. H. Risch

[CDE 634b, Advanced Applied Analytic Methods in Epidemiology and Public Health The goal of this course is to provide students with the knowledge and necessary skills to carry out advanced analytic methods in epidemiology. Through lectures and readings, students are introduced to various advanced modeling techniques that are commonly used in epidemiology. In addition, students are taught how to use, manipulate, and understand the provided programming codes using the relevant software. Students have the chance to practice through laboratory times and multiple exercises. Students are trained on interpreting the results of the relevant method, describing the method, and presenting the results. The analytic techniques covered include propensity score analysis, mixed models, cluster analysis, area under the curve, principal component analysis, factor analysis, nested-case control analysis, case cohort analysis, discriminant analysis, mediation modeling, pathway analysis, hierarchical modeling, structural equation modeling (SEM), latent class analysis, and classification and regression tree analysis. Not offered in 2015–2016]

CDE 650a, Introduction to Evidence-Based Medicine and Health Care Evidence-based medicine and health care use best current evidence in addressing clinical or public health questions. This course introduces principles of evidence-based practice in formulating clinical or public health questions, systematically searching for evidence, and applying it to the question. Types of questions include examining the comparative effectiveness of clinical and public health interventions, etiology, diagnostic testing, and prognosis. Particular consideration is given to the meta-analytic methodology of synthesizing evidence

in a systematic review. Also addressed is the role of evidence in informing economic analysis of health care programs and clinical practice guidelines. Using a problem-based approach, students contribute actively to the classes and small-group sessions. Students complete a systematic review in their own field of interest using Cochrane Collaboration methodology. Prerequisite: students must have passed CDE 516b, or obtain permission of the instructor. S. Wang

CDE 670a,b, Advanced Field Methods in Chronic Disease Epidemiology The course offers direct experience in field methods in chronic disease epidemiology for doctoral students who have not yet taken qualifying exams. Students are expected to actively participate as part of a research team (8–10 hours per week) doing field research in some aspect of chronic disease epidemiology. It is expected that their progress will be directly supervised by the Principal Investigator of the research project. This course can be taken for one or two terms and may be taken for credit. Prerequisite: arrangement with a faculty member must be made in advance of registration. Faculty

CDE 676b, Questionnaire Development This course is designed to direct students through the process of questionnaire selection and development for use in health research. Questionnaires and surveys are used extensively in medical, epidemiological, and public health research. The specific questionnaire utilized has great potential to affect research conclusions. Students learn to critically evaluate existing measures and how to construct questionnaires for use in health research. Topics include constructs and operational definitions, writing and evaluating questionnaire items, item scaling, domain sampling, item wording and readability, test bias, and item weighting and scoring. Students learn how to evaluate psychometric indicators (e.g., internal consistency, reliability and validity coefficients). Students are required to construct a questionnaire and are guided through all phases of questionnaire development, including item generation, scaling decisions, survey design, pilot testing, data collection, reliability analysis, and calculation of validity coefficients. The practical learning goal is to generate a publication-level questionnaire to evaluate a unique exposure history or health-related construct. By course end, students are able to critically evaluate existing measures and have the skills necessary to develop psychometrically valid tools for research. Prerequisites: CDE/EMD 508a and BIS 505b (may be taken concurrently). M. White

ENVIRONMENTAL HEALTH SCIENCES

EHS 502b/CDE 502b, Physiology for Public Health The objective of this course is to provide a comprehensive working knowledge of the primary physiologic and metabolic systems that respond to environmental stressors. A major emphasis of the course is to analyze potential health consequences of these stressors: examining vulnerabilities affected by age, chronic disease, and sedentary lifestyle, as well as protection afforded by healthy lifestyle factors. C. Yeckel

EHS 503a/E&ES 896a, Principles of Toxicology This course introduces students to the concepts and nomenclature of toxicology. Emphasis is placed on the absorption, distribution, metabolism, and elimination of toxic substances. Our goal is to provide a fundamental understanding of important toxicological principles and their relevance

to the more general study of human health. The course utilizes case studies that require students to apply their knowledge of toxicologic concepts and processes to refine issues and solve problems in epidemiology and public health. J. Borak, C. Fields

EHS 505a, Occupational Exposure Assessment and Control This course offers an introduction to methods used to protect the health and safety of workers. Topics include exposure assessment for identifying and evaluating chemical and physical hazards; ergonomics; health and safety standards; personal protective devices; management programs to control hazards; injury and illness record-keeping; and worker's compensation programs. Case studies complement traditional lectures. Offered every other year. H. Cohen

EHS 507a, Environmental Epidemiology Environmental epidemiology can provide insight about the association between environmental exposures of a population and adverse health outcomes. The potentials and the limitations of environmental epidemiology are explored as they are inherent in the design of suitable studies and as they manifest themselves in actual studies that have been conducted. The analysis and interpretation of such studies, as well as the consequences for the design and conduct of proposed studies, are examined. Prerequisite: CDE/EMD 508a or permission of the instructor. Y. Zhang, J. Hoh

EHS 508b/F&ES 897b, Assessing Exposures to Environmental Stressors This course examines human exposure to environmental stressors as it applies to environmental epidemiology and risk assessment. Indirect and direct methods of assessing exposures are reviewed and case studies are presented. B. Leaderer

EHS 510a, Principles of Environmental Health Environmental Health focuses on human health effects of exposure to chemical, physical, and biological agents in the community, workplace, and home. This course teaches the principles and tools related to recognizing, assessing, understanding, and mitigating the impacts of environmental agents. Topics include air and water pollution, foodborne illness, climate change, energy use, occupational health, children's health, environmental justice, and pesticide use. N. Deziel

EHS 511b/F&ES 893b, Applied Risk Assessment This course introduces students to the nomenclature, concepts, and basic skills of quantitative risk assessment (QRA). The goal is to provide an understanding necessary to read and critically evaluate QRA. Emphasis is on the intellectual and conceptual basis of risk assessment, particularly its dependence on toxicology and epidemiology, rather than its mathematical constructs and statistical models. Specific cases consider the use of risk assessment for setting occupational exposure limits, establishing community exposure limits, and quantifying the hazards of environmental exposures to chemicals in air and drinking water. J. Borak, C. Fields

EHS 520b/CDE 520b, Case-Based Learning for Genetic and Environmental Diseases This course covers the basic concepts, methodology, and up-to-date research approaches central to understanding genetic and environmental causes of human diseases. Lectures are based on comprehensive illustrations with several historical landmark studies; real-life stories, cartoons, and videos are used throughout. Students leave the class with an appreciation of genetics and an understanding of how to appropriately use the study designs, analyses, and interpretations to discover disease susceptibility genes. In

addition, students learn how epigenetics affects disease presentation. Critically, students are expected to equip themselves to tackle the causes of the disease of their own interest. Participation in in-class as well as out-of-class discussions, take-home quiz sets, hands-on exercises with real data, and a presentation are the criteria for the final grade. No prerequisites. J. Hoh

EHS 525a and b, Seminar and Journal Club in Environmental Health Students are introduced to a wide variety of research topics, policy topics, and applications in environmental health science. The course consists of seminar presentations and journal club meetings that alternate weekly. The seminar series includes biweekly presentations by EHS faculty and outside experts, followed by a discussion period. The journal club series includes student presentations and discussion on one or two scientific literatures related to the seminar topic of the following week. This course is designed to promote critical thinking regarding current topics in environmental health science as well as to help students develop topics for their theses. Y. Chen

EHS 545b, Molecular Epidemiology Many diseases are the outcome of a complex inter-relationship between multiple genetic, epigenetic, and environmental factors. Individual susceptibility to disease is influenced more by certain genes than by exposure to environmental agents. This course covers basic concepts of human genetics as well as recent discoveries in the field of epigenetics that are fundamental to understanding how individuals differ in their susceptibility to environmental agents and how these susceptibilities change over time. Current knowledge of molecular approaches to identifying specific genetic variations and epigenetic alterations associated with human diseases are introduced, and their roles in gene-environment interactions and disease development are discussed. The course includes formal lectures, article discussions, and laboratory component, which provides hands-on experiences of some commonly used molecular techniques for detecting genetic and epigenetic changes. Y. Zhu

EHS 573b, Epidemiological Issues in Occupational and Environmental Medicine This course explores issues around the detection and characterization of health outcomes from environmental and occupational exposures. Case studies include infectious disease outbreaks, cancer clusters in the general environment and within industrial settings, groundwater contaminations and birth defects, lung diseases and cancers following the World Trade Center attacks, health sequelae in military populations, radon exposures and lung cancers in miners and in the general population, exposures among marginalized populations. The course is taught in discussion format by occupational and environmental medicine faculty. There is a take-home final examination. M. Russi, M. Slade

EHS 575a, Introduction to Occupational and Environmental Medicine This course presents a broad overview of the principles of occupational and environmental medicine. The major diseases of environmental origin and the major hazards – chemical, physical, and biologic – and settings in which they occur are examined. M. Stowe

EHS 580b, Environmental Hormones and Human Health This course provides a scientific orientation to environmental hormones and human health. The course introduces the basic concepts of four different types of hormones, including endogenous hormones, natural environmental hormones, pharmaceutical hormones, and environmental

endocrine disruptors. The course discusses the current understanding of the relationship between hormones and human health, with emphasis on the methodology of studying the relationship between environmental hormones and environmental endocrine disruptors and human cancer risk. Prerequisites: CDE/EMD 508a and BIS 505a. Y. Zhang

EHS 584b, Water Quality in Public Health The diminished quality of ambient and drinking water supplies globally is linked to urbanization, industrialization, and the competitive use of water for domestic, industrial, and agricultural purposes. Although the presence of pathogens remains the focus for drinking water treatment in both developed and undeveloped countries, direct and indirect exposures to chemical contaminants in water is a growing environmental health concern. This course emphasizes the occurrence, characterization, and impact of chemical toxicants – both natural and anthropogenic – in surface and ground waters, as well as transport and fate in the hydrosphere. The history, development, and current regulatory approaches to drinking water and ambient water quality monitoring and protection are presented from a public health perspective. J. Dunn

[**EHS 585a/FE&S 898a, The Environment and Human Health** This course provides an overview of the critical relationships between the environment and human health. The class explores the interaction between health and different parts of the environmental system including water, indoor and outdoor air, environmental justice, and occupational health. Other topics include exposure assessment, case studies of environmental health disasters, links between climate change and health, and integration of scientific evidence on environmental health. Students learn about current key topics in environmental health and how to critique and understand scientific studies. The course incorporates lectures and discussion. Enrollment limited to twenty-five. Not offered in 2015–2016]

EHS 600a,b, Independent Study or Directed Readings Independent study or directed readings on a specific research topic agreed upon by faculty and student. By arrangement with faculty.

EHS 610b, Applied Area Readings for Qualifying Exams Required of EHS Ph.D. students, in preparation for qualifying exams. Readings arranged with specific faculty in related research area. By arrangement with faculty.

EPIDEMIOLOGY AND PUBLIC HEALTH

EPH 100a, Professional Skills Seminar The Professional Skills Seminar is intended to prepare M.P.H. students for leadership positions as public health professionals. Material covered includes public speaking, presentation skills, professional writing, negotiation and conflict resolution, and networking and social media. Attendance at all sessions is required (elective for Advanced Professional M.P.H. students), and some homework is a part of the program. Although no credit or grade is awarded, satisfactory performance will be noted on the student's transcript. W. Vance

EPH 500b, Public Health Practicum This course is one of the options available to students to fulfill the practice requirement for the M.P.H. degree. The course design combines experiential learning and guided classroom discussion. Students are assigned to

a field placement in an appropriate setting that affords the opportunity to apply public health concepts and competencies learned in the classroom through a practice experience that is relevant to the student's areas of specialization. Emphasis is placed on situating students in community-based organizations and other public health service settings such as local or state health departments, where they can work on authentic public health problems and issues. This course provides a means for students to gain exposure to the mission and activities of diverse public health organizations and thus may help to inform their decisions about professional work pursuits upon completion of the M.P.H. degree. Open only to second-year M.P.H. students and Advanced Professional M.P.H. students.
E. O'Keefe, M.A. Booss

EPH 515a, Ethics and Public Health: An Introduction This four-session seminar introduces students to the ethical implications of public health programs, policies, and research initiatives; their historical roots; and the regulations and guidelines governing human subjects research in the United States and internationally. Case studies are used to demonstrate selected ethical challenges in public health policy, practice, and research. In addition, students learn the functions and procedures of Yale's Human Research Protection Program and complete its Web-based training on human subjects research.
K. Khoshnood

EPH 520c, Summer Internship The Internship is a degree requirement that is completed in the summer between the first and second academic years. Students work with their faculty advisers, the Career Management Center, and the Office of Public Health Practice to identify suitable placements, which include medical care facilities, community agencies, research projects, laboratories, and other sites engaged in public health activities. The internship experience sometimes serves as a basis for the M.P.H. thesis. The internship is displayed on the transcript with a grade of "S" (Satisfactory) upon completion. A course unit is *not* given for the summer internship.

All students, with the exception of those in the Advanced Professional M.P.H. Program, *must* complete a Summer Internship. The Summer Internship may be used to complete the practice requirement for the M.P.H. degree with prior approval from the Office of Public Health Practice.

EPH 525b, Thesis The thesis (2 course units) is typically a yearlong project that is completed in the second academic year and is the culmination of the student's educational experience at YSPH. It is frequently a report of a small research project performed independently by the student. Students work with faculty advisers in designing their project and in writing the thesis. Detailed guidelines for the thesis are outlined in Appendix II.

The thesis is not a requirement for students in the Health Care Management, Health Policy, or Advanced Professional M.P.H. programs (except for those in the Occupational and Environmental Medicine track).

EPH 542b, Practice-Based Community Health Research This course is one of the options available to students to fulfill the practice requirement for the M.P.H. degree. The course develops students' skills in planning and designing practice-based community health research projects. The course content is based on an ecological framework, principles of community and public health ethics, and a teaching strategy of significant

learning experiences and team-based learning. Given the current emphasis on using evidence-based practices in public health, this course helps students develop skills in turning practice activities and data into evidence. Teams of students work on a practicum assignment with a local agency. Through this exercise and related assignments throughout the term, students develop skills in planning and implementing practice-based research projects, including developing project timelines, logic models, and program impact theories. In addition, students work on a community-driven research project with three to five other students at a local agency based on proposals submitted by a range of community organizations. D. Humphries

EPH 591a and b, Global Health Seminar The Global Health Seminar is a yearlong, weekly elective course intended to help students in the health professions develop an understanding of key aspects of global health research and practice. The course features faculty from across the health professional schools and other global health experts from around the world. The goal is for students to attain a good understanding of key issues upon which they may base future research, service, and clinical pursuits in the field of global health. Although no course credit is awarded, satisfactory performance is noted on the student's transcript. M. Skonieczny

EPH 600b, Research Ethics and Responsibility This course seeks to introduce major concepts in the ethical conduct of research and some of the personal and professional issues that researchers encounter in their work. Sessions are run in a seminar/discussion format. Prerequisite: doctoral student or postdoctoral status only. C. Tschudi

[**EPH 650a and b, Public Health Forum for Ph.D. Students** This course provides Ph.D. students with a broad introduction to public health by exposing them to the various disciplines and the multitude of factors that can impact a public health problem. Open only to Public Health doctoral students. Not offered in 2015–2016]

EPIDEMIOLOGY OF MICROBIAL DISEASES

EMD 508a/CDE 508a, Principles of Epidemiology I This course presents an introduction to epidemiologic definitions, concepts, and methods. Topics include history of epidemiology, descriptive epidemiology, measurement of disease occurrence and association, study design (ecologic, cross-sectional, case-control studies, cohort, and intervention), surveillance, measurement validity and screening, random variation and precision, bias, confounding, effect modification, and causality. The course also teaches skills for quantitative problem solving and for understanding epidemiologic concepts in the published literature. L. Nicolai

[**EMD 512a, Immunology for Epidemiologists** This course is designed to introduce students to the fundamentals of immunology including antigens, antibodies, methods for detecting antibodies, cells of the immune system, products of such cells, and immune mechanisms. Experience is gained in the analysis of primary research papers with relevance to immunologic aspects of epidemiologic studies. Prerequisite: two terms of college biology. Not offered in 2015–2016]

EMD 518a, Principles of Infectious Diseases I This course explores the epidemiology and biology of infectious agents and the diseases they cause. Through a theme-based, integrated approach, students learn about the epidemiology, pathogenesis, prevention, and control of bacteria, viruses, and eukaryotic parasites of public health importance. Emphasis is placed on epidemiological methods, routes of transmission, host-pathogen interactions, and mechanisms of virulence. The course also teaches skills for understanding and evaluating the published literature, specifically through class discussions and oral presentations of assigned readings by students. Topics covered include gastrointestinal, respiratory, and sexually transmitted pathogens. M. Pettigrew

EMD 518b, Principles of Infectious Diseases II This course explores the epidemiology and biology of infectious agents and the diseases they cause. Through a theme-based, integrated approach, students learn about the epidemiology, pathogenesis, prevention, and control of bacteria, viruses, and eukaryotic parasites of public health importance. Emphasis is placed on epidemiological methods, routes of transmission, host-pathogen interactions, and mechanisms of virulence. The course also teaches skills for understanding and evaluating the published literature, specifically through class discussions and oral presentations of assigned readings by students. The course builds upon concepts covered in EMD 518a and introduces new topics such as infectious causes of chronic diseases; and vector-borne, zoonotic, and emerging pathogens. J. Childs

EMD 525a and b, Seminar in Epidemiology of Microbial Diseases This is a weekly seminar series offered by EMD faculty. The presentations describe the ongoing research activities in faculty laboratories as well as in EMD-affiliated centers. The talks introduce the department's research activities as well as associated resources in the area. Attendance is required for first-year EMD students. V. Pitzer

EMD 530b, Health Care Epidemiology: Improving Health Care Quality through Infection Prevention The history, descriptive epidemiology, surveillance methods, risk analysis methods, and economics of nosocomial infections are outlined in this introductory course. In-depth explorations of host, agent, and environmental factors influencing typical nosocomial illnesses in pediatric and adult services are reviewed by clinical faculty. Descriptive and analytical epidemiological methods are emphasized. L. Dembry, D. Banach

EMD 536b, Investigation of Disease Outbreaks This course provides students with the basic skills and perspectives necessary to investigate acute disease outbreaks. The emphasis is on the use of epidemiology to investigate outbreaks of infectious diseases, although the methods are not limited and can be applied to outbreaks of noninfectious diseases as well. Through this course, it is hoped that students will gain a better appreciation of epidemiology as the science of public health and of the use of epidemiology to guide public health interventions and the development of public health policy. Offered every other year. M. Cartter

EMD 538a, Quantitative Methods for Infectious Disease Epidemiology This course provides an overview of statistical and analytical methods that apply specifically to infectious diseases. The assumption of independent outcomes among individuals that

underlies most traditional statistical methods often does not apply to infections that can be transmitted from person to person. Therefore, novel methods are often needed to address the unique challenges posed by infectious disease data. Topics include analysis of outbreak data, estimation of vaccine efficacy, time series methods, and Markov models. The course consists of lectures and computer labs in which students gain experience analyzing example problems using a flexible computer programming language (MATLAB).
V. Pitzer

EMD 539b, Introduction to Public Health Surveillance Surveillance is one of the fundamental activities of public health organizations and is critical for understanding disease burden, impacts of interventions, and the detection of unusual events. The first part of the course provides an overview of the types of surveillance systems and their strengths and weakness, sources of data for surveillance, and controversies resulting from surveillance activities. The second part of the course focuses on methods used to analyze surveillance data, with a particular focus on practical application. There is a focus throughout on the critical evaluation of surveillance data from different sources.
D. Weinberger

EMD 540b, Responding to Violent Conflict: Epidemiologic Methods and Public Health Interventions In this course we discuss how epidemiological methods are applied to understand specific health consequences of violent conflicts, including infectious diseases, mental health, maternal/child health, and chronic health problems. In addition, we critically examine interventions employed to mitigate these negative consequences and assess the evidentiary basis for their efficacy with the goal of understanding what makes some interventions more successful than others. Throughout the course, we consider inevitable ethical challenges of conducting research in fragile settings and with vulnerable populations who often lack basic services and are suffering human rights violations.
K. Khoshnood

[**EMD 543a/CDE 543a, Global Aspects of Food and Nutrition** The course presents a core topic in global health and development that is at the intersection of science, society, and policy. The course familiarizes students with leading approaches to analyzing the causes of malnutrition in countries around the world and to designing and evaluating nutrition interventions. It covers micronutrient and macronutrient deficiencies; approaches to reducing malnutrition; the cultural, economic, environmental, agricultural, and policy context within which malnutrition exists; and the relationships between common infections and nutritional status. Not offered in 2015–2016]

EMD 548b/ARCG 762b^U/F&ES 726b/G&G 562b^U, Observing Earth from Space A practical introduction to satellite image analysis of Earth's surface. Topics include the spectrum of electromagnetic radiation, satellite-borne radiometers, data transmission and storage, computer image analysis, the merging of satellite imagery with GIS and applications to weather and climate, oceanography, surficial geology, ecology and epidemiology, forestry, agriculture, archaeology, and watershed management. Prerequisites: college-level physics or chemistry, two courses in geology and natural science of the environment or equivalents, and computer literacy. R. Smith, X. Lee

EMD 550b/682b, Biology of Insect Disease Vectors Insects transmit pathogens that cause many emerging and re-emerging human and agriculture-related diseases. Many of these diseases, which are referred to as neglected tropical diseases (NTDs), have a dramatically negative impact on human health in the developing world. Furthermore, they cause indirect devastation by significantly reducing agricultural productivity and nutrient availability, exacerbating poverty and deepening disparities. This course introduces students to the biological interactions that occur between major groups of important disease vectors and the pathogens they transmit. Lectures cover current research trends that relate to the ecology and physiology of insect vectors. Course content focuses on how these aspects of vector biology relate to the development and implementation of innovative and effective disease-control strategies. Prerequisite: full year of college/university-level biology, or permission of the instructor(s). S. Sksoy, B. Weiss

EMD 563a or b, Laboratory and Field Studies in Infectious Diseases The student gains hands-on training in laboratory or epidemiologic research techniques. The term is spent working with EMD faculty in a single laboratory or epidemiology research group. Students choosing to work in the laboratory gain experience in molecular biology, basic immunology, parasitology, virology, bacteriology, or vector biology. Students may also choose to work on a non-laboratory-based epidemiology research project. These students gain experience in epidemiologic methods including study design, field data collection including human cases, vectors, and environmental parameters, data analysis, and epidemiological modeling. Prerequisite: permission of the instructor. M. Pettigrew

EMD 567a, Tackling the Big Three: Malaria, TB, and HIV in Resource-Limited Settings Malaria, tuberculosis, and HIV account for more than five million deaths worldwide each year. This course provides a deep foundation for understanding these pathogens and explores the public health issues that surround these infectious diseases in resource-limited settings. Emphasis is placed on issues in Africa, but contrasts for each disease are provided in the broader developing world. The course is divided into three sections, each focusing in depth on the individual infectious disease as well as discussions of interactions among the three diseases. The sections consist of three to four lectures each on the biology, individual consequences, and community/public health impact of each infectious disease. Discussion of ongoing, field-based research projects involving the diseases will be led by relevant faculty (research into practice). The course culminates with a critical discussion of major public health programmatic efforts to tackle these diseases, such as those of PEPFAR, the Bill & Melinda Gates Foundation, the Global Fund, and the Stop TB Partnership. Prerequisite: EMD 518a. S. Parikh

EMD 670a and b, Advanced Research Laboratories This course is required of all EMD Ph.D. students and is taken for three terms. The course offers experience in directed research and reading in selected research laboratories. The first two terms must be taken in the first year of the doctoral program, and the third term is normally taken in the summer after the first year. Open only to doctoral students. C. Tschudi

EMD 680a/MBIO 680a, Advanced Topics in Tropical Parasitic Diseases An introductory topic-based course in modern parasitology. For each topic there is an introductory lecture followed by a journal club-like discussion session of relevant papers selected from

the literature. The course provides an introduction to basic biological concepts of parasitic eukaryotes causing diseases in humans. Topics include strategies used by parasitic eukaryotes to establish infections in the host and approaches to disease control, through either chemotherapy, vaccines, or genomics. In addition, emphasis is placed on evaluating the quality and limitation of scientific publications and developing skills in scientific communication. Prerequisite: permission of the instructor. D. McMahon-Pratt, C. Tschudi

EMD 695a,b/E&EB 961a/960b, Studies in Evolutionary Medicine I and II This two-term course begins in January. Students learn the major principles of evolutionary biology and apply them to issues in medical research and practice by presenting and discussing original papers from the current research literature. Such issues include lactose and alcohol tolerance; the hygiene hypothesis and autoimmune disease; human genetic variation in drug response and pathogen resistance; spontaneous abortions, immune genes, and mate choice; parental conflicts over reproductive investment mediated by genetic imprinting; life history trade-offs and the evolution of aging; the evolution of virulence and drug resistance in pathogens; the evolutionary genetics of humans and their pathogens; the ecology and evolution of disease; the evolutionary origin of diseases; and the emergence of new diseases. Students develop a research proposal based on one of their own questions in spring term, spend the summer on a research project related to their research proposal, and write a paper based on the results of their research in fall term. Credit and grades are awarded for each term. Only students who have engaged in summer research projects may enroll in the fall term. Admission is by competitive application only. Forms are available on the E&EB department Web site. J. Childs, P. Turner, S. Stearns

HEALTH POLICY AND MANAGEMENT

HPM 502a/MGT 502a, Foundations of Accounting and Valuation Distinguishing value creation from redistribution is a key problem faced by any economy. Modern accounting practices are focused on this problem, and knowledge of them is extremely useful. Further, value creation activities in a modern society can become complex and abstract, and accounting practices have developed accordingly. While worthy of a lifetime of study, the purpose of this course is to enable the student to gain a foundation upon which a deep understanding of accounting can be built. One cannot have a sensible discussion of accounting as assessing value without having some idea of what value means and how to think about it. Therefore, this course begins by exploring the basic determinants of value and the techniques used to assess it: discounting cash flow and risk/return analysis. These techniques are based on the timing and statistical properties of cash flow. With this introduction, the course then turns to the more fundamental processes of generating cash flow by creating value through the production and delivery of goods or services and then converting that value into cash flows. The basic financial statements, balance sheets, income statements, and cash flow statements as well as the accounting mechanics with which they are built are introduced in this context. S. Garstka

HPM 510a, Introduction to Health Policy and Health Systems This course provides an introduction to the making and understanding of health policy. The various goals of policy making and the alternative means of achieving those goals are examined. Health

issues are placed in the context of broader social goals and values. The current performance of the health care system is assessed, with particular emphasis on shifting needs, rising costs, and changing institutional arrangements. The course provides an overview of the important actors in the health care and political systems and introduces students to methods for understanding their behavior. Students apply these methods to a set of concrete policy issues. J. Schwartz

HPM 514b, Health Politics, Governance, and Policy This course is designed to familiarize students with the various processes by which governmental health policy is made in the United States, and with current policy debates. One focus of the course is to understand the politics underlying the successes and failures of health policy making during the course of the twentieth century. This includes a discussion of the relevant governmental institutions, political actors, the major national programs that have been established, and how political actors use resources and set their strategies. M. Schlesinger

HPM 542b, Health of Women and Children The focus of this course is women's and children's health and health care in the United States. Emerging health issues and related health policy are presented and discussed in terms of epidemiology, including racial/ethnic disparities and effects of poverty; utilization and financing of children's health care; and existing programs and public policies that facilitate access to care. Data sources and data needs are identified. Topics may include history of MCH programs and policy, Medicaid and SCHIP, low birth weight and infant mortality, maternal mortality, reproductive health, breast and cervical cancer screening, pediatric oral health, pediatric asthma, childhood obesity, adolescent health care and teen pregnancy, children with special health care needs, childhood injuries and injury prevention. Students are expected to critically evaluate the public health implications of selected conditions and the effect of public policy on availability, accessibility, acceptability of services, and accountability in health care for women and children. M. A. Lee

HPM 545b, Health Disparities This course explores our nation's striking inequities in morbidity, mortality, and injury (including by race, ethnicity, socioeconomic and immigration status, gender, and geography), with particular focus on the social determinants of the inequities. Through readings drawn from multiple disciplines, the course examines such topics as the impacts on health of poverty and inequality in income, wealth, and education; overt and implicit discrimination; residential segregation and poverty concentration and associated differential exposures to environmental hazards and health-promoting resources; differential access to, and quality of, health care; and the role of law as a determinant of health inequity. A variety of interventions to address health inequities are reviewed and critiqued, as are some of the ways law and policy are being used as a tool to promote health equity. S. Geballe

[HPM 546a, Ethical Issues in Public Health This course is a study of ethical and social dimensions of public health policy and practice both within the United States and globally. Public health always has a normative as well as a scientific aspect. Social legitimacy and public trust are always essential to effective public health. Ideals of human rights, individual liberty, social justice and equality, community, solidarity, and the common good are

central to public health policy and practice. At the same time, however, existing structures of power, coercion, discrimination, and stigma also shape those policies and practices.

Important frameworks of ethical and political theory are explained and compared, including utilitarianism, rights theory, theories of social and global justice, and democratic and elitist theories of governance. These frameworks are then applied to selected public health issues. Topics include global health justice, the ethical implications of studies of the social determinants of health, the cultural framing of health and illness, ethical issues in infectious disease control, and ethical conflicts arising in health promotion and behavior modification interventions in cases such as smoking and obesity. Environmental health and the global health effects of climate change are also explored. Not offered in 2015–2016]

HPM 555a and b, Health Policy or Health Care Management Practicum This course is one of the options available to HPM students to fulfill the practice requirement for the M.P.H. degree. The practicum is a project-based learning experience. Students work 8–10 hours per week for one or two terms. The Health Policy Practicum allows students to work on current state and/or local health policy issues while placed with state and/or local legislative or executive agency policy makers, or with senior staff at a nonprofit health policy or advocacy group. The Health Management Practicum allows students to focus on current issues confronting a hospital department while working under the guidance of a departmental administrator. Students are required to attend the first week of class to enroll. Prerequisite: permission of the instructor. This class is not open to first-year M.P.H. students in the fall term. R. Stahl (HCM), S. Geballe (HP)

HPM 560b, Health Economics and U.S. Health Policy This course introduces students to the organization and operation of the American health care system. The course examines systems of health care delivery and finance and recent trends in their organization, including the growth of managed care. The course seeks to provide students with an understanding of the existing structure of the system and with conceptual frameworks. Z. Cooper

HPM 561b/MGT 630b, Managing Health Care Organizations This course is designed to integrate previous course work in management and in public health to further participants' understanding of organizational, managerial, and strategic issues facing health care organizations (HCOs) and the health care workforce. The course provides participants with a foundation for developing, implementing, and analyzing efforts to improve HCOs' performance. A major objective of the course is to sharpen the leadership, problem solving, and presentation skills of those who aim to hold operational and strategic positions in health care organizations. Through case studies, readings, in-class exercises, and class discussions, participants learn analytic frameworks, concepts, tools, and skills necessary for leading and managing organizational learning, quality improvement, innovation, and overall performance in health care organizations. I. Nembhard

HPM 566b, Critical Issues in Global Health The course focuses on critical challenges to the health of the poor in low- and middle-income countries and pays particular attention to how these health gaps can be addressed in low-cost and highly effective ways. The course covers the architecture, politics, and governance of global health; key trends in

approaches to meeting the health needs of the poor in low- and middle-income countries; and how science and technology can be harnessed for this purpose. It examines the burden of disease and the determinants of this burden; covers the leading causes of illnesses, disability, and preventable death from communicable and noncommunicable diseases, with special attention to women and children; and focuses particular attention on key health systems issues and recent efforts to overcome them, especially in low-income settings. R. Skolnik

HPM 570a, Cost-Effectiveness Analysis and Decision Making This course introduces students to the methods of decision analysis and cost-effectiveness analysis in health-related technology assessment, resource allocation, and clinical decision making. The course aims to develop technical competence in the methods used; practical skills in applying these tools to case-based studies of medical decisions and public health choices; and an appreciation of the uses and limitations of these methods at the levels of national policy, health care organizations, and individual patient care. D. Paltiel

HPM 583b, Methods in Health Services Research This course introduces students to both quantitative and qualitative methods for research in health services. Topics include research objectives and hypotheses formulation, study design, sampling techniques, measurement, data analysis, results presentation, and discussion. Students synthesize these skills in the final paper. Prerequisite: BIS 505a. X. Chen

HPM 586a, Microeconomics for Health Policy and Health Management This course introduces students to microeconomics, with an emphasis on topics of particular relevance to the health care sector. Attention is paid to issues of equity and distribution, uncertainty and attitudes toward risk, and alternatives to price competition. This course is designed for students with minimal previous exposure to economics. A. Friedman

[**HPM 587a, Advanced Health Economics** This course applies the principles learned in Microeconomics for Health Policy and Health Management (HPM 586b) to the health of individuals, to health care institutions and markets, as well as to health care policy. The economic aspects of health behaviors, hospital markets, cost-benefit analysis, regulation, and the market for physician services are covered. Prerequisite: microeconomics or permission of the instructor. Not offered in 2015–2016]

HPM 588a, Public Health Law This course focuses on the law of population health, examining the legal powers and duties of federal, state, and local governments to promote and protect the health of their communities, as well as the constraints placed on those powers to protect individual rights. A course designed specifically for students with no legal training, it introduces students to the multiple ways the law can be used as a tool to advance public health, including through direct and indirect regulation to alter the information and built environments; through governments' power to tax and spend to fund public health programs and services, and in ways that can influence individual and corporate behavior; and through the courts. Students gain basic proficiency in finding, reading, and interpreting primary legal sources, in applying the law to public health problems, and in identifying ways to most effectively influence legislative, administrative, and judicial lawmaking processes to promote and protect (and also thwart efforts to impede) public health. Prerequisite: HPM 514b or permission of the instructor. S. Geballe

[HPM 589a, Leadership and Public Health This course examines in depth several key conceptual frameworks related to leadership, with application to a variety of public health and medical topics. The class focuses on four interrelated challenges: (1) working across boundaries defined by roles, power, and race; (2) managing common resources to maximize social welfare; (3) anticipating and responding to change at social, organizational, and individual levels; and (4) understanding paradoxes in leadership in a complex world. Assignments include active participation and attendance in class sessions; a midterm reflection paper; a group experience resulting in a short paper; and a final paper that uses concepts developed in the class and readings to analyze the leadership landscape associated with a public health or medical problem chosen by the student, and to determine whether the leadership is addressing the problem effectively and why. Not offered in 2015–2016]

HPM 590b, Addiction, Economics, and Public Policy Smoking, alcoholism, and use of illicit drugs are addictions that are increasingly studied by economists. Overeating resulting in obesity can also be viewed as an addiction. This class studies economic and policy issues relating to these four addictions. Specifically, the class covers (1) models of substance use including rational addiction and behavioral economics, (2) alternative views on whether, why, and how to intervene in personal decisions, (3) facts and findings from the literature on each addiction, and (4) policies related to each. Policy issues include supply and demand sides of illicit drugs; how to prevent drug-related crime; taxes on alcohol, cigarettes, and soda; treatment effectiveness; legal interventions such as the case against the tobacco companies; the role of public information and private marketing; and paying people for good habits. Prerequisite: microeconomics. J. Sindelar

[HPM 592a/GLBL 322a/HLTH 450a/PLSC 121a, Strategic Thinking in Global Health This course defines and applies a set of core principles regarding development and implementation of grand strategy and problem solving in global health. Students come to understand and apply principles of grand strategy and strategic problem solving, which are taught at both a conceptual and a practical level as applied to common problems in global health. Students develop expertise in political and policy analysis as well as organizational theory and leadership skills that are central to addressing global health issues in low- and middle-income countries. Not offered in 2015–2016]

HPM 597b, Capstone Course in Health Policy This course is designed as the capstone educational experience for students concentrating in health policy. It integrates previous course work in health policy and public health and facilitates students' transition from the academic setting into the world of professional policy analysis. Students practice different approaches to policy formulation, policy analysis, and policy implementation. As part of their course assignments, students use various strategies to frame policy debates to promote desired outcomes. There is extensive work on improving oral and written presentation skills pertinent to current, applied policy dilemmas. Prerequisite: HPM 510a or equivalent. M. Schlesinger

HPM 600a,b, Independent Study or Directed Readings Independent study or directed readings on a specific research topic agreed upon by faculty and student. By arrangement with faculty.

HPM 601b/F&ES 862b/PSYC 601b, The Science of Science Communication The simple dissemination of valid scientific knowledge does not guarantee it will be recognized by non-experts to whom it is of consequence. The science of science communication is an emerging, multidisciplinary field that investigates the processes that enable ordinary citizens to form beliefs consistent with the best available scientific evidence, the conditions that impede the formation of such beliefs, and the strategies that can be employed to avoid or ameliorate such conditions. This course surveys, and makes a modest attempt to systematize, the growing body of work in this area. Special attention is paid to identifying the distinctive communication dynamics of the diverse contexts in which non-experts engage scientific information, including electoral politics, governmental policy making, and personal health decision making. D. Kahan

HPM 610b, Applied Area Readings for Qualifying Exams Required of HPM Ph.D. students, in preparation for qualifying exams. Readings arranged with specific faculty in related research area. By arrangement with faculty.

HPM 617a,b, Colloquium in Health Services Research This seminar focuses on the analysis of current issues in health policy and on state-of-the-art methodological issues in health services research. The format includes guest speakers and presentations of ongoing research projects by YSPH and other faculty and graduate students. Students participate in critical discussions of the issues that arise in both types of sessions. Prerequisite: doctoral status or permission of the instructor. Z. Cooper

HPM 620a/b, Readings in Health Services Research In-depth readings, discussion, and analysis of topics specific to health policy research. Optional for Ph.D. students choosing this area of depth. By arrangement with faculty

HPM 630b, Advanced Readings in Health Services Research In-depth readings, discussion, and analysis of topics specific to health services research. Optional for Ph.D. students choosing this area of depth. By arrangement with faculty

HPM 698b/MGT 698b, Health Care Policy, Finance, and Economics This course teaches students the critical skills in analyzing and working within the health care industry. The first part of the course focuses on the economic and financial drivers of the domestic health care system, including private and public financing and delivery models. In the latter part of the course, students learn about current issues of importance to this \$3 trillion industry. The course is part didactic/part seminar in style, with team projects and presentations as a major component of the grade. Open to M.P.H. students in Health Care Management, SOM students, and others with permission of the instructor. H. Forman

HPM 699a,b/MGT 699a,b, Colloquium in Health Care Leadership This seminar series, meeting on the medical school campus, introduces the students to leading figures in health care: public sector, private sector, and third sector executives and leaders discuss their career paths and current insights into the evolution and revolution in health care delivery and services. The course provides credit in the spring term for a full year of attendance. Only students who have been attending fall sessions can enroll in the spring. H. Forman

Tuition, Expenses, and Financial Aid

The standard student budget for M.P.H. students for the nine-month academic year 2015–2016 is as follows:

Tuition	\$39,600
Activity Fee	395
Course Materials and Copy Fees	1,060
Yale Hospitalization/Specialty Coverage	2,176
Room and Board	14,060
Personal	3,925
Total Budget	\$61,216

TUITION RATES

Full-Time

Matriculated students who are enrolled in the M.P.H. program and are taking 4 or more course units in a term are considered full-time and must pay two full years of tuition (four terms). Students may not shorten the four-term requirement by accumulating course units sufficient to graduate at the end of three terms. Full-time students must carry a minimum of 4 course units in their final term.

Part-Time

Matriculated students taking fewer than 4 course units in a term are considered part-time students. Part-time students pay tuition on a per-course basis (\$3,000 per course unit). Part-time students are encouraged to take at least 2 course units per term. Students enrolled in the M.P.H. program must take at least 3 course units to be eligible for financial aid.

Advanced Professional M.P.H. Program

Students enrolled in the Advanced Professional M.P.H. Program pay two full terms of tuition and \$9,926 tuition for the summer module.

Accelerated M.B.A./M.P.H. Program in Health Care Management

Students enrolled in the Accelerated M.B.A./M.P.H. Program in Health Care Management pay \$9,926 tuition for the summer module and four terms of tuition equivalent to tuition rates at the School of Management.

Joint-Degree Students

Joint-degree students – excepting those in the Accelerated M.B.A./M.P.H. Program – with the Graduate School of Arts and Sciences (including the M.A./M.P.H. with the Jackson Institute for Global Affairs); the schools of Divinity, Forestry & Environmental Studies, Law, Management, and Nursing; and the Physician Associate Program in the School of Medicine pay three terms of tuition to YSPH.

Joint M.D./M.P.H. students pay one-half the annual tuition at the Yale School of Medicine.

Yale Faculty and Staff

Yale faculty and staff members who are taking individual courses for credit will be charged tuition on a per-course basis (\$3,000 per course unit). Yale faculty and staff who have matriculated in the M.P.H. program pay the appropriate tuition rate (full-time or part-time).

Auditors and Non-Matriculated Students

Auditors not affiliated with Yale University pay tuition on a per-course basis (\$3,000 per course unit) and are required to receive the permission of the instructor as well as the permission of the registrar. Non-matriculated students who enroll in the summer session also pay tuition on a per-course basis (\$3,000 per course unit).

Individuals affiliated with Yale (but not currently paying tuition at Yale) will be charged half of the per-course rate to audit a course (\$1,500 per course unit). Permission of the registrar and the course instructor is required.

M.S. in Biostatistics Students

M.S. students are required to pay two full years of tuition to the Graduate School of Arts and Sciences and should refer to the bulletin of the Graduate School.

Ph.D. Students

Ph.D. students should refer to the bulletin of the Graduate School of Arts and Sciences for information about tuition and fees.

TUITION REBATE AND REFUND POLICY

On the basis of the federal regulations governing the return of federal student aid (Title IV) funds for withdrawn students, the rebate and refund of tuition is subject to the following policy.

1. For purposes of determining the refund of federal student aid funds, any student who withdraws from YSPH during the first 60 percent of the term will be subject to a pro rata schedule that will be used to determine the amount of Title IV funds a student has earned at the time of withdrawal. A student who withdraws after the 60 percent point has earned 100 percent of the Title IV funds. In 2015–2016, the last days for refunding federal student aid funds will be November 3, 2015, in the fall term and April 1, 2016, in the spring term.
2. For purposes of determining the refund of institutional aid funds and for students who have not received financial aid:
 - a. 100 percent of tuition will be rebated for withdrawals that occur on or before the end of the first 10 percent of the term (September 11, 2015, in the fall term and January 28, 2016, in the spring term).
 - b. A rebate of one-half (50 percent) of tuition will be granted for withdrawals that occur after the first 10 percent but on or before the last day of the first quarter of

the term (September 26, 2015, in the fall term and February 12, 2016, in the spring term).

- c. A rebate of one-quarter (25 percent) of tuition will be granted for withdrawals that occur after the first quarter of a term but on or before the day of midterm (October 20, 2015, in the fall term and March 7, 2016, in the spring term).
 - d. Students who withdraw for any reason after midterm will not receive a rebate of any portion of tuition.
3. The death of a student will cancel charges for tuition as of the date of death, and the bursar will adjust the tuition on a pro rata basis.
 4. If the student has received student loans or other forms of financial aid, funds will be returned in the order prescribed by federal regulations; namely, first to Federal Direct Unsubsidized Loans, if any; then to Federal Perkins Loans; Federal Direct Graduate PLUS Loans; next to any other federal, state, private, or institutional scholarships and loans; and, finally, any remaining balance to the student.
 5. Recipients of federal and/or institutional loans who withdraw are required to have an exit interview before leaving Yale. Students leaving Yale receive instructions on completing this process from Yale Student Financial Services.

Tuition Rebate and Refund Policy for Summer Session

If the student withdraws during the first week of the program, 100 percent of the tuition will be refunded.

Withdrawal during week two of the program will result in a 50 percent refund of tuition.

Withdrawal between weeks two and four will result in a 25 percent tuition refund.

Tuition will not be refunded for withdrawals after week four of the summer session.

STUDENT ACCOUNTS AND BILLS

Student accounts, billing, and related services are administered through the Office of Student Financial Services, which is located at 246 Church Street. The telephone number is 203.432.2700, or visit www.yale.edu/sfs/contactus.

Bills

Yale University's official means of communicating monthly financial account statements is through the University's Internet-based system for electronic billing and payment, Yale University eBill-ePay. Yale does not mail paper bills.

Student account statements are prepared and made available twelve times a year at the beginning of each month. Payment is due in full by 4 p.m. Eastern Time on the first business day of the following month. E-mail notifications that the account statement is available on the University eBill-ePay Web site (www.yale.edu/sis/ebep) are sent to all students at their official Yale e-mail addresses and to all student-designated authorized payers. From the eBill-ePay Web site, students can designate up to three authorized payers to access the eBill-ePay system in order to view the monthly student account statements and make online payments.

Bills for tuition, room, and board are available during the first week of July, due and payable by August 1 for the fall term; and during the first week of November, due and payable by December 1 for the spring term. The Office of Student Financial Services will impose late fees of \$125 per month (up to a total of \$375 per term) if any part of the term bill, less Yale-administered loans and scholarships that have been applied for on a timely basis, is not paid when due. Nonpayment of bills and failure to complete and submit financial aid application packages on a timely basis may result in the student's involuntary withdrawal from the University.

No degrees will be conferred and no transcripts will be furnished until all bills due the University are paid in full. In addition, transcripts will not be furnished to any student or former student who is in default on the payment of a student loan.

The University may withhold registration and certain University privileges from students who have not paid their term bills or made satisfactory payment arrangements by the day of registration. To avoid delay at registration, students must ensure that payments reach Student Financial Services by the due dates.

Payments

There are a variety of options offered for making payments. Yale University eBill-ePay (www.yale.edu/sis/ebep) is the *preferred* means for payment of your monthly student account bill. The ePayments are immediately posted to the student account. There is no charge to use this service. Bank information is password-protected and secure, and a printable confirmation receipt is available. On bill due dates, payments using the eBill-ePay system can be made up to 4 p.m. Eastern Time in order to avoid late fees.

For those who choose to pay the student account bill by check, remittance advice with mailing instructions is available on the eBill-ePay Web site. All bills must be paid in U.S. currency. Checks must be payable in U.S. dollars drawn on a U.S. bank. Payments can also be made via wire transfer. Instructions for wire transfer are available on the eBill-ePay Web site.

Yale does *not* accept credit card payments.

A processing charge of \$25 will be assessed for payments rejected for any reason by the bank on which they were drawn. In addition, the following penalties may apply if a payment is rejected:

1. If the payment was for a term bill, a \$125 late fee will be charged for the period the bill was unpaid.
2. If the payment was for a term bill to permit registration, the student's registration may be revoked.
3. If the payment was given to settle an unpaid balance in order to receive a diploma, the University may refer the account to an attorney for collection.

Yale Payment Plan

The Yale Payment Plan (YPP) is a payment service that allows students and their families to pay tuition, room, and board in ten equal monthly installments throughout the year based on individual family budget requirements. It is administered by the University's Office of Student Financial Services. The cost to enroll in the YPP is \$100 per contract.

The deadline for enrollment is June 25. For additional information, please contact Student Financial Services at 203.432.2700 and select “Press 1” from the Main Menu. Details concerning the Yale Payment Plan are available at www.fc.campusoncall.com/ypp/intro.asp.

FINANCIAL AID POLICIES FOR M.P.H. STUDENTS

The YSPH Student Financial Aid Office is located in the Office of Student Affairs, 47 College Street. Andre Massiah, Director of Financial Aid, can be reached at 203.785.5417 or andre.massiah@yale.edu. The financial aid policies at YSPH are designed to assist all students as equitably as possible. Financial aid awards are determined annually based on the estimated cost of attendance for the year in which aid is awarded. Continuing students are required to reapply for aid for their second year. The estimated student budget includes all projected costs related to academic and living expenses. The budget does not include expenses related to maintaining an automobile.

Though YSPH awards a limited number of merit scholarships, the majority of Yale financial aid is awarded on the basis of demonstrated financial need. Loans are first awarded, and, depending upon the remaining need, students may receive a need-based grant from YSPH.

Federal Veterans Education Benefits

The M.P.H. program is approved for Federal Veterans Education benefits under the GI Bill. To check your eligibility for benefits, visit the Web site www.benefits/va.gov/gibill. To be enrolled, see the registrar.

Loans

For 2015–2016, all U.S. citizens or permanent residents of the United States are eligible to borrow up to \$33,000 from the Federal Direct Unsubsidized loan program. This amount may vary depending on what other financial aid a student may be receiving. Federal Direct loans generally have a ten-year repayment period beginning six months after a student graduates or drops below half-time enrollment.

Eligibility

Students who are matriculated in the M.P.H. program and are registered for 3 or more course units per term are eligible to apply for federal financial aid.

International Students

International students are not eligible to receive need-based grants from YSPH or federal loan programs. International students may be considered for merit-based scholarships from YSPH.

Reporting Outside Resources

Additional financial support in the form of loans, scholarships, fellowships, additional family support, or employment of any type must be reported to the Financial Aid Office. Any such changes may result in a proportional reduction in the financial aid awarded,

either federal loans or school grants. Students who receive a full tuition scholarship are not eligible for the YSPH grant.

Satisfactory Academic Progress (SAP)

Information on SAP as it affects federal financial aid programs is available online at <http://publichealth.yale.edu/about/gateways/students>.

Academic Policies

FACULTY ADVISERS

Each student is assigned a faculty adviser upon entering the M.P.H. program. It is the responsibility of the student and the faculty adviser to work together to select courses, monitor academic progress, and develop career plans. For a variety of reasons a student may wish to change his or her faculty adviser. The change of adviser form is available online at <http://publichealth.yale.edu/about/gateways/students>.

COURSE REGISTRATION

The beginning of each term is considered a “shopping period” in which students attend classes they are interested in taking. All students must complete the online registration by September 16 in the fall term and February 2 in the spring term to avoid a \$50 late fee. At the end of the shopping period, all registrations are considered final. *Note: Courses cannot be added after the registration deadline without permission of the faculty adviser and the registrar.* See below for information on withdrawing from courses.

Many departments require students to take electives toward their M.P.H. degree. Electives used toward degree requirements are to be used to enhance the student’s public health competencies as they pursue the M.P.H. degree. Thus, electives are typically health-related. Exceptions can be made if the student can justify that the elective course content will enhance his or her public health competencies and public health career goals.

Students are allowed to enroll in courses in other Yale schools if there is space available and if the instructor agrees. Students must receive written permission from the registrar of the Law School and the School of Management for any courses taken at those schools. *Note: An additional course material fee may apply to courses taken outside YSPH.*

One course unit is awarded for any full-term course (not seminars or colloquia) taken in the Graduate School or another professional school. Credit is not granted for courses that are taken on a pass/fail or credit/no credit basis. All courses taken outside of YSPH must be graded (H, HP, P) in order to receive a course unit. Courses taken at Yale College (undergraduate) must be 300 series or above in order to receive a course unit toward the M.P.H. degree.

Note: M.P.H. students are not eligible to “audit” classes at YSPH.

Nonmatriculated part-time study in the M.P.H. program is available with the course instructor’s permission. Nonmatriculated part-time students are individuals who attend classes and participate fully in a course; complete assignments, papers, or examinations; and receive a transcript attesting to completion of the course, credit hours, and a grade. A nonmatriculated student is limited to no more than two courses per term and a maximum of three courses total. All course requirements will be completed by the end of the term. Exceptions must be negotiated with the course instructor.

Part-time nonmatriculated students pay tuition on a per-course basis (\$3,000 per course unit). In the event a nonmatriculated student is accepted to and enrolls in a degree program at the Yale School of Public Health, the student is permitted to apply the maximum three courses toward the degree. However, there will be no modification in tuition.

Taking YSPH courses as a nonmatriculated student does not guarantee acceptance into any program at the Yale School of Public Health.

COURSE WITHDRAWAL

Students may withdraw from a course with the approval of their faculty adviser. Course withdrawal forms are available online at <http://publichealth.yale.edu/about/gateways/students>. Students may withdraw from a course until October 16 in the fall term and March 11 in the spring term without the course appearing on the transcript. From those dates until the last day of classes (December 11, fall term; April 29, spring term) a student may withdraw from a course; however, the course will appear on the transcript with a letter grade of “W”

First-year students are not allowed to withdraw from Introduction to Statistical Thinking I (BIS 505a) or Principles of Epidemiology I (CDE/EMD 508a).

EXEMPTION FROM REQUIRED COURSES

Students who feel they have previously covered the material being presented in a required course (not an elective) can request a “course exemption” directly from the course instructor. The instructor must sign the course exemption form (available online at <http://publichealth.yale.edu/about/gateways/students>), and the student must submit it at the time of registration. Students are still required to register for exempted courses. Exempted courses will be listed on the transcript with a grade of “Q.” Exempted courses cannot be used to satisfy the course unit requirement for the M.P.H. degree.

GRADING SYSTEM

The YSPH grading system is designed to foster an atmosphere of cooperative learning. Consequently, YSPH does not compute the grade point average (GPA) or class rank of its students. Students are graded only to provide them with a formal evaluation of their understanding of the concepts presented in their courses.

All YSPH courses are graded Honors (H), High Pass (HP), Pass (P), or Fail (F). The Internship, seminars, and colloquia receive a grade of Satisfactory (S) upon successful completion. The grade of “Q” indicates courses for which a student has received a course exemption.

1. A grade of Honors should be assigned for performance that is distinguished. This reflects contributions that go beyond the requirements for the course, either in terms of the creativity of their application, the complexity of the settings in which the ideas are applied, or their ability to build on the methods and ideas taught in the class.
2. A grade of High Pass should be assigned for students who have demonstrated a proficiency in the use of class material. Students earning this grade not only understand the material that was taught but can also deploy it in constructive ways for new problems.
3. A grade of Pass should be assigned for students who have demonstrated an understanding of the class material. They must be able to accurately describe ideas and methods and identify contexts in which they are appropriately used. Passing

grades indicate that students are capable of performing competently in this domain as public health professionals.

4. A grade of Fail should be assigned to students who cannot demonstrate an acceptable understanding of the core ideas, methods, or other class material and thus lack competence in this domain of public health.

The instructor for each course will determine the specific performance criteria that correspond to each of these tiers of academic achievement. Consequently, quantitative thresholds for particular grades may vary from one course to the next and in some courses may depend on factors (e.g., class participation) that are not readily quantified.

A failure in any course remains on the student's transcript. If the course is retaken, it is listed again on the transcript with the new grade.

It is expected that instructors will require all course assignments, including term papers and exams, to be submitted by the last day of the term. In very rare cases, students may receive a grade of Incomplete (I). The instructor and the associate dean for student affairs will jointly review each case to approve permission for a student to submit work after the end of the term. Permission may be granted because of an incapacitating illness, a serious family emergency, or another matter of comparable import. If the instructor and the associate dean cannot reach a consensus, the matter will be referred to the Committee on Academic Progress for resolution. The instructor and the associate dean will stipulate the date on which the student's late work will be due (this date cannot exceed three months from the last day of the term) and will determine the date on which the instructor is expected to submit a course grade to the registrar. If the student's work has not been completed by the stipulated date, the grade of Incomplete (I) will be converted to a failing grade (F).

Students with a grade of Incomplete will not be allowed to participate in YSPH Commencement activities.

The transcript is a permanent record. Grade changes may only be made if the instructor reports to the registrar that a clerical or computational error has resulted in an inaccurate grade. The University considers an instructor's evaluation of the quality of a student's work to be final. Disputes about a course grade that are alleged to result from discrimination based on race, sex, religion, national or ethnic origin, or handicap are resolved through the University's student grievance procedures.

TUTORIAL SUPPORT

Students experiencing academic difficulty should seek prompt assistance. Students should first discuss the problem with the course instructor. Course instructors can suggest that a student's academic difficulties be addressed by a course's teaching assistant (TA). If after working with the TA the student continues to experience difficulty, the course instructor can recommend that specific tutorial assistance be provided to the student. The instructor should contact the associate dean for student affairs to arrange tutorial assistance.

All M.P.H. student transcripts are reviewed by the associate dean for student affairs at the end of each term. Advisers have access to each advisee's transcript both as an early warning of academic difficulty and as an aid to planning course load and selection.

ACADEMIC STANDARDS

Students in the M.P.H. program must pass all core and departmental requirements. Any student who fails a required course must retake it and pass it. The Committee on Academic Progress will review the academic performance of a student whose record in any term shows significant decline, or if there is a reason for concern about the overall quality of a student's work.

Any student who receives a failing grade in the summer session will be withdrawn from the M.P.H. program.

Academic Probation

The Committee on Academic Progress will place students whose academic work is unsatisfactory on Academic Probation. The committee will take into account the personal situation of the student, but a failing grade in any course will normally result in Academic Probation. Students who receive failing grades in two or more courses during a term, or who receive a second failing grade after being placed on Academic Probation, will be withdrawn from the M.P.H. program.

Information on Satisfactory Academic Progress (SAP) as it affects federal financial aid programs is available online at <http://publichealth.yale.edu/about/gateways/students>.

CHANGE OF DEPARTMENT

Departmental changes may be requested during the spring term of the *first* academic year. Students who wish to change departments must apply in writing to the chair of the requested department to do so. In addition to a written statement about why they want to transfer, students submit a copy of an unofficial YSPH transcript. If the change is approved, the student must submit a change of department form to the Office of Student Affairs. Students must be sure to fulfill all course requirements for the new department. Change of department forms are available online at <http://publichealth.yale.edu/about/gateways/students>.

Note: Because of the number of requirements and the sequencing of courses, students may not switch into the Health Care Management Program after the second week of the first term.

OTHER CHANGES AND APPEALS IN EDUCATIONAL PROGRAM

Other significant changes in a student's educational program should be discussed with the student's faculty adviser and requested in writing to the Committee on Academic Progress. Appeals resulting from decisions made by the Committee on Academic Progress must be addressed to the dean of Public Health, with the description of the basis for appeal. Appeals are heard by the Committee of Permanent Officers, whose decision is final.

YSPH COMMITTEE ON ACADEMIC AND PROFESSIONAL INTEGRITY (CAPI)

Guiding Principles

Honesty, professional integrity, and a commitment to the health of the public provide strong foundations for our educational mission at the Yale School of Public Health (YSPH). We create a community of scholarship through the free and lively exchange of ideas in the classrooms, laboratories, clinics, organizations, and neighborhoods in which we serve. We promote scientific rigor, courage, and compassion to guide us in the work we do—designed to prevent disease and promote health.

The YSPH *Code of Academic and Professional Integrity* is intended to foster our School's exceptional learning environment and to support conduct that will distinguish our faculty, students, and staff in our lives at YSPH, the University, New Haven, and the broader scientific, policy, and public health communities in which we live and work.

ACADEMIC INTEGRITY

The Yale School of Public Health community, including faculty, students, and staff, supports the highest standards of academic integrity. All academic work—completed individually or in small groups, in the classroom, laboratory, or community—affords an unparalleled opportunity to put forth new and innovative ideas to promote the science and practice of public health.

Faculty will provide clear guidelines for students on the parameters of all course work, including homework assignments, papers, and examinations. Students must contact the professor for clarification if there is any question about these guidelines. Students must complete their work independently or in small groups, as per instruction, always striving to put forth their own best ideas to accomplish their goals. Students are strongly encouraged to build on a strong tradition of public health by utilizing the many excellent print and online resources available to stimulate thinking and promote innovation. In so doing, students must also consult guidelines to insure proper citation of published work.

- Citation Guide from *Chicago Manual of Style*: http://chicagomanualofstyle.org/tools_citationguide.html
- Various citation resources: <http://library.duke.edu/research/citing>

COMMUNITY STANDARDS

The YSPH community is inclusive in nature, respecting the diverse backgrounds and views of all its members. Faculty, students, and staff must aspire to standards of conduct that further distinguish the School as a center of professional and personal integrity. We must adhere to ethical guidelines and the highest standards of professional and personal behavior. We abide by the principles of the *Human Relations Code of Conduct, Yale University School of Medicine*:

Yale University School of Medicine is committed to the promotion of personal and professional development of all individuals in its community, and encourages dialogue that will foster the growth, well-being, and dignity of all its members. In pursuit of these goals, the School is dedicated to maintaining an environment which places the highest priority on collegial relationships, mutual respect, and sensitivity among

students, faculty, staff, and patients. An educational community functions best when there is civility and respect for the dignity and worth of each individual.

It must be ensured that our School is free from discrimination and acts of intolerance based on race, gender, sexual orientation, religion, national origin, ancestry, age, or physical handicap. This commitment remains consonant with the obligation to protect open and wide-ranging public discourse. The principle of freedom of expression that might otherwise protect even the most offensive public speech does not protect, nor does it even encompass, a right to threaten the dignity and privacy of an individual. Such personally directed behavior will not be tolerated; it is antithetical to academic values, debilitates its victims, compromises the offenders, and undermines the University's fundamental commitment to individual freedom and respect for all its members. Furthermore acts of intolerance may destroy the very atmosphere wherein freedom of expression is otherwise tolerated and cherished.

Code of Academic and Professional Integrity

HONOR CODE

The Honor Code explicates the highest ethical standards to which we must hold ourselves, our peers, and our colleagues. Honesty, respect, and trust are hallmarks of the science and practice of public health. They must be nurtured at all times in our classrooms and in our work beyond the classroom. Upon arrival at YSPH, all students will sign an Honor Code that states:

By enrolling in the Yale M.P.H. program, I am accepting the responsibility to promote and uphold the Code of Academic and Professional Integrity.

I understand that the work I submit must represent my own efforts; that I will conduct myself with dignity, integrity, and honesty in my studies; that I will uphold the directions of my faculty and complete all my work in the spirit it was assigned. I understand I must honestly represent my credentials, abilities, and situation as I further my career as a public health professional.

I agree to be held accountable for maintaining the atmosphere of honesty and professionalism at Yale University and within the greater academic community. In the spirit of my professional development—where I should not tolerate misconduct in my professional setting—I also agree to contact the appropriate faculty member, or the associate dean of student affairs, if I witness a violation of this Code of Academic and Professional Integrity by any of my peers.

Upon completion of all written assignments and examinations, students will sign the following statement:

I have not given, received, or witnessed inappropriate exchange of information on this assignment, and I certify that this is my own original work.

BEHAVIORS SUBJECT TO DISCIPLINARY ACTION

Students at YSPH freely associate themselves with the University, and in doing so affirm their commitment to the University's principles of honesty and academic integrity. They are expected to abide by all University regulations, as well as local, state, and federal laws. The forms of behavior subject to disciplinary action include, but are not limited to:

1. **Cheating and plagiarism** Plagiarism and cheating are understood to include all forms of misrepresentation in academic and professional work, such as:
 - a. Failure to acknowledge ideas and phrases used in an essay or assignment that were gained from another writer, including the Internet. Any direct quotation must be specifically attributed, and any other reliance on a reference must be acknowledged.
 - b. Cheating on examinations, problem sets, and any other form of assignment or test.
 - c. Falsification and/or fabrication of data, or misrepresentation in any report on research or other work.
 - d. Submission of the same paper in more than one course or as a thesis, unless explicit permission from the instructors has been obtained in advance.
 - e. Use of prepared notes in an examination or communicating with another person during an examination (including take-home examinations) unless specifically authorized by the instructor.
 - f. Use of electronic files belonging to another person, or electronically sharing files when this is specifically prohibited by the instructor.
2. **Misrepresentation or lying**
 - a. Misrepresentation or lying in applications for admission or financial aid.
 - b. Misrepresentation or lying during a formal or informal inquiry by School or University officials. If the Committee on Academic and Professional Integrity has found that the student purposefully misled the committee during its deliberations, the committee may consider that factor as grounds for imposing a more severe penalty.
3. **Assault, coercion, harassment** Assault on, or coercion, harassment, or intimidation of any member of the University community for any reason, including harassment on the basis of race, religion, gender, ethnicity, or sexual orientation; sexual harassment; or use of a teaching position to harass or intimidate another student.
4. **Violation of Yale University rules/functions**
 - a. Disruption of a legitimate function or activity of the University community, including disruption of classes and meetings, blocking entrances and exits to University buildings, unauthorized occupation of any space on the Yale campus, or preventing the free expression or dissemination of ideas.
 - b. Unauthorized or fraudulent use of University services, equipment, or facilities, such as computer equipment, telephones, or letterhead.
 - c. Misuse, alteration, or fabrication of University credentials or documents, such as an identification card, academic transcript, or grade list.
 - d. Violation of University rules for using information technology services and facilities, including computers, the University network, and electronic mail.
 - e. Misuse or unauthorized removal of materials in University libraries or laboratories.
 - f. Trespassing on University property to which access is prohibited.
 - g. Theft, misuse of funds, or willful damage to University property.
 - h. Refusal to comply with the direction of a University Police Officer or other University official, including a member of faculty, acting in the performance of his or her duties.

- i. Interference with the proper operation of safety or security devices, including fire alarms, electronic gates, or sprinkler systems.
5. **Illegal activity** Any behavior prohibited by law may be subject to criminal prosecution as well as to a charge by the Committee on Academic and Professional Integrity.
 - a. Illegal behaviors directed against the University or the University community.
 - b. Possession or use of explosives or weapons on University property.
 - c. Unlawful manufacture, possession, use, or distribution of illicit drugs or alcohol on University property or as part of any University activity.

Disciplinary Policies and Procedures

COMMITTEE COMPOSITION AND CHARGE

The Committee on Academic and Professional Integrity considers instances of academic infractions and other serious violations by YSPH students against the School and University communities. The committee is appointed by the dean and consists of a faculty member from each YSPH division, the associate dean for student affairs, and a student from each M.P.H. class. The dean will designate one of the faculty members as the committee chair. When members of the committee have become familiar with the details of a specific complaint, the chair will determine if any members shall be excused because of a conflict of interest.

PROCESS

The committee will collect the facts relevant to each complaint under consideration, make judgments on whether an infraction or violation has been committed, and determine a penalty where appropriate. Although deviations may be taken by the chair when appropriate to a given case, the following steps are customary:

1. The work of the committee normally begins when a member of the YSPH community (faculty, student, or staff) brings a possible violation or infraction to the attention of the committee chair or the associate dean for student affairs. The chair then requests a written statement and copies of any other materials relevant to the complaint. Based on these materials the chair, in consultation with the associate dean for student affairs, will decide whether the offense, if the charge is true, is of sufficient severity to bring to the attention of the committee. If so, the associate dean for student affairs will notify the student who is the subject of the complaint in writing, and provide the student with a list of the committee members and a copy of these procedures. The student should be aware of his or her rights to: (a) appear before the committee; (b) examine all written materials being provided to the committee; (c) ask for the recusal of any member of the committee for cause; (d) be accompanied by a member of the YSPH community who will act as an adviser. In the YSPH Disciplinary Process the student's adviser is not an advocate, but rather a source of support to the student. The adviser may help the student prepare for the meeting of the committee and may accompany the student to the meeting. During the meeting the adviser may quietly suggest questions or issues for the student to raise with the committee, but the adviser does not participate directly in the meeting. An adviser is optional. If so desired, a student may select a member of the YSPH community and ask that individual to act as an adviser; an adviser is not appointed by the committee.

2. The student must respond in writing to the charge of misconduct within three days of receiving notification from the associate dean for student affairs. The written response should be a statement of reasonable length which comments on the facts of the allegations of misconduct, the student's involvement in it, and any other matters that the student deems relevant.
3. The committee will endeavor to conduct its business in such a way as to protect the privacy and personal integrity of all individuals who are involved with the case. In addition, the committee will seek to make its judgments as promptly as is consistent with the need to establish the facts of the case and to come to judgments based on those facts.
4. The hearing will normally take place in a single continuous session, but the chair may call additional sessions if appropriate. The chair will open the meeting by reviewing the charges against the student and the procedures to be followed. The student may make a brief opening statement. The committee will then direct questions to the student as to the facts of the case, and it is the student's duty to respond truthfully. After responding to the committee's questions, the student may make a brief closing statement.
5. The chair may call additional witnesses as appropriate, including the individual(s) who reported the possible violation. The student may ask the committee to call witnesses who can present relevant information about the facts of the case.
6. All committee deliberations will be conducted without the presence of the student or any other person who is not a member of the committee. The committee will consider only evidence that has been presented to it at the hearing. If the committee concludes that an infraction or violation has occurred, it will then recommend an appropriate penalty. The committee's decision on the penalty will be by majority vote, except that any recommendation to suspend or expel a student must be by a two-thirds vote of the committee. Penalties will be set based upon the severity of the infraction. Any serious infraction of the Code of Academic and Professional Integrity may be grounds for dismissal.
7. At the conclusion of its hearing and deliberations, the committee will prepare a report for the YSPH dean which describes the charge of misconduct, summarizes the hearing, presents the factual findings, and outlines the committee's conclusions, including any proposed penalty. The dean will determine whether the committee's conclusion is supported by the evidence. If the dean determines that the conclusion is not supported by the evidence, the dean will remand the decision for further fact finding or deliberation. The dean will also review the proposed penalty and may approve or change it if he or she believes that a lesser or greater penalty is warranted.
8. Unless remanded by the dean for further review, the finding of an infraction or violation is final, as is the penalty upon the dean's concurrence. The dean will inform the student in writing of the result of the hearing and any penalty as soon as possible.
9. All proceedings of the Committee on Academic and Professional Integrity are confidential. Proceedings and the final determination are shared only with members of the committee, the dean, the student who is the subject of the disciplinary proceeding, and, upon the finding of a violation, the student's faculty adviser as well as the director of graduate studies. Students found in violation of the Honor Code

or the Code of Academic and Professional Integrity will not be permitted to serve as Teaching Fellows.

PENALTIES

The following penalties are among those that may be recommended by the committee and imposed by the dean. Any violation of the Honor Code or the Code of Academic and Professional Integrity will result in a penalty, up to and including expulsion. The Yale School of Public Health regards cheating and plagiarism as grievous offenses that strike at the heart of academic integrity, for which the standard penalty will be two terms of suspension.

1. **Reprimand** A written statement of censure will remain in the student's file until the student graduates or withdraws.
2. **Restriction** Denial of the use of certain University facilities or of the right to participate in certain activities or to exercise certain privileges.
3. **Disciplinary Probation** The student is in official jeopardy. The commission of a second offense while on probation will normally result in suspension or expulsion. Disciplinary probation will be recorded on the student's transcript.
4. **Suspension** Separation from the University for a stated period of time. A suspended student forfeits all privileges of enrollment including residence, attendance at classes, participation in organized extracurricular activities, and use of University facilities. This penalty will be recorded on the student's transcript.
5. **Expulsion** Permanent separation from the University. This penalty will be recorded on the student's transcript.

All cases referred to the Committee on Academic and Professional Integrity will be addressed, and a decision made by the committee, regardless of whether the student voluntarily withdraws from the Yale School of Public Health prior to resolution. It will be noted on the student's transcript that the student withdrew with disciplinary charges pending. Students at the Yale School of Public Health on an F1 Student Visa who are suspended or expelled will be subject to the requirements of the F1 Student Visa program administered by the U.S. Government. Such students should consult with the Yale Office of International Students and Scholars to understand the current requirements.

APPEAL PROCESS

A student upon whom a disciplinary penalty has been imposed by the dean of Public Health will have the right to appeal this decision to the dean of the School of Medicine on the following two grounds: (1) that the committee made procedural errors in its deliberations; or (2) that substantial new information is available that was not previously available to the committee. A written notice of appeal must be submitted to the dean of the School of Medicine within five business days after the decision of the committee and the dean of Public Health has been received. The procedures by which such an appeal will be considered and decided will be determined by the dean of the School of Medicine. There will normally be no stay of any disciplinary penalty imposed by the dean of Public Health during the appeal process.

In Conclusion

We set forth this Yale School of Public Health *Code of Academic and Professional Integrity* to provide guidance and support for professional standards expected from all members of our community. Violations of this code will be taken very seriously, and penalties will be issued to uphold these standards. More importantly, however, is the commitment by faculty, students, and staff to promote excellence in education, research, and service. By upholding academic honesty and integrity, we have a stable foundation from which to move forward in our work to enrich science and improve the health of the public.

Committee on Academic and Professional Integrity 2005–2006; updated May 2010, July 2012, May 2015

Administrative Policies

LEAVE OF ABSENCE

Students are expected to follow a continuous course of study at the School of Public Health. However, a student who wishes or needs to interrupt his or her study temporarily may request a leave of absence. There are three types of leave – personal, medical, and parental – all of which are described below. The general policies that apply to all types of leave are:

1. Any student who is contemplating a leave of absence should see the associate dean for student affairs (Frank Grosso) to discuss the necessary application procedures.
2. All leaves of absence must be approved by the associate dean for student affairs. Medical leaves also require the written recommendation of a physician on the staff of Yale Health, as described below.
3. A student may be granted a leave of absence for up to two terms. Any leave approved by the associate dean for student affairs will be for a specified period.
4. International students who apply for a leave of absence should consult with OISS regarding their visa status.
5. A student on leave of absence may complete outstanding work in any course for which he or she has been granted extensions. He or she may not, however, fulfill any other degree requirements during the time on leave.
6. A student on leave of absence is not eligible for financial aid, including loans; and in most cases, student loans are not deferred during periods of nonenrollment.
7. A student on leave of absence is not eligible for the use of any University facilities normally available to enrolled students.
8. A student on leave of absence may continue to be enrolled in Yale Health by purchasing coverage through the Student Affiliate Coverage plan. In order to secure continuous coverage from Yale Health, enrollment in this plan must be requested prior to the beginning of the term in which the student will be on leave or, if the leave commences during the term, within thirty days of the date when the leave is approved. Coverage is not automatic; enrollment forms are available from the Member Services Department of Yale Health, 203.432.0246.
9. A student on leave of absence must notify the associate dean for student affairs (Frank Grosso) in writing of his or her intention to return at least eight weeks prior to the end of the approved leave. In addition, if the returning student wishes to be considered for financial aid, he or she must submit appropriate financial aid applications to the School's financial aid office to determine eligibility.
10. A student on leave who does not return at the end of the approved leave, and does not request and receive an extension from the associate dean for student affairs, is automatically dismissed from the School.

Personal leave of absence A student who wishes or needs to interrupt study temporarily because of personal exigencies may request a personal leave of absence. The general policies governing all leaves of absence are described above. A student who is current with his or her degree requirements is eligible for a personal leave after satisfactory completion of

at least one term of study. Personal leaves cannot be granted retroactively and normally will not be approved after the tenth day of a term.

To request a personal leave of absence, the student must apply in writing before the beginning of the term for which the leave is requested, explaining the reasons for the proposed leave and stating both the proposed start and end dates of the leave and the address at which the student can be reached during the period of the leave. If the dean finds the student to be eligible, the leave will be approved. In any case, the student will be informed in writing of the action taken. A student who does not apply for a personal leave of absence, or whose application for a personal leave is denied, and who does not register for any term by the registration deadline, will be considered to have withdrawn from the School.

Medical leave of absence A student who must interrupt study temporarily because of illness or injury may be granted a medical leave of absence with the approval of the dean, on the written recommendation of a physician on the staff of Yale Health. The general policies governing all leaves of absence are described above. A student who is making satisfactory progress toward his or her degree requirements is eligible for a medical leave any time after matriculation. The final decision concerning a request for a medical leave of absence will be communicated in writing by the dean.

The School of Public Health reserves the right to require a student to take a leave for medical reasons when, on recommendation of the director of Yale Health or the chief of the of Mental Health and Counseling department, the associate dean for student affairs determines that the student is a danger to self or others because of a serious medical problem, or that the student has refused to cooperate with efforts deemed necessary by Yale Health to determine if the student is such a danger. An appeal of such a leave must be made in writing to the associate dean for student affairs no later than seven days from the date of withdrawal.

A student who is placed on medical leave during any term will have his or her tuition adjusted according to the same schedule used for withdrawals (see Tuition Rebate and Refund Policy). Before re-registering, a student on medical leave must secure written permission to return from a Yale Health physician.

Leave of absence for parental responsibilities A student who wishes or needs to interrupt study temporarily for reasons of pregnancy, maternity care, or paternity care may be granted a leave of absence for parental responsibilities. The general policies governing all leaves of absence are described above. A student who is making satisfactory progress toward his or her degree requirements is eligible for parental leave any time after matriculation.

Any student planning to have or care for a child is encouraged to meet with the associate dean for student affairs (Frank Grosso) to discuss leaves and other short-term arrangements. For many students, short-term arrangements rather than a leave of absence are possible. Students living in University housing units are encouraged to review their housing contract and the related policies of the Graduate Housing Office before applying for a parental leave of absence. Students granted a parental leave may continue to reside in University housing to the end of the academic term for which the leave was first granted, but no longer.

U.S. MILITARY LEAVE READMISSIONS POLICY

Students who wish or need to interrupt their studies to perform U.S. military service are subject to a separate U.S. military leave readmissions policy. In the event a student withdraws or takes a leave of absence from Yale School of Public Health to serve in the U.S. military, the student will be entitled to guaranteed readmission under the following conditions:

1. The student must have served in the U.S. Armed Forces for a period of more than thirty consecutive days;
2. The student must give advance written or oral notice of such service to the associate dean for student affairs. In providing the advance notice the student does not need to indicate whether he or she intends to return. This advance notice need not come directly from the student, but rather, can be made by an appropriate officer of the U.S. Armed Forces or official of the U.S. Department of Defense. Notice is not required if precluded by military necessity. In all cases, this notice requirement can be fulfilled at the time the student seeks readmission, by submitting an attestation that the student performed the service.
3. The student must not be away from the School to perform U.S. military service for a period exceeding five years (this includes all previous absences to perform U.S. military service but does not include any initial period of obligated service). If a student's time away from the School to perform U.S. military service exceeds five years because the student is unable to obtain release orders through no fault of the student or the student was ordered to or retained on active duty, the student should contact the associate dean for student affairs to determine if the student remains eligible for guaranteed readmission.
4. The student must notify the School within three years of the end of his or her U.S. military service of his or her intention to return. However, a student who is hospitalized or recovering from an illness or injury incurred in or aggravated during the U.S. military service has up until two years after recovering from the illness or injury to notify the School of his or her intent to return.
5. The student cannot have received a dishonorable or bad conduct discharge or have been sentenced in a court-martial.

A student who meets all of these conditions will be readmitted for the next term, unless the student requests a later date of readmission. Any student who fails to meet one of these requirements may still be readmitted under the general readmission policy but is not guaranteed readmission.

Upon returning to the School, the student will resume his or her education without repeating completed course work for courses interrupted by U.S. military service. The student will have the same enrolled status last held and with the same academic standing. For the first academic year in which the student returns, the student will be charged the tuition and fees that would have been assessed for the academic year in which the student left the institution. Yale may charge up to the amount of tuition and fees other students are assessed, however, if veteran's education benefits will cover the difference between the amounts currently charged other students and the amount charged for the academic year in which the student left.

In the case of a student who is not prepared to resume his or her studies with the same academic status at the same point where the student left off or who will not be able to complete the program of study, the School will undertake reasonable efforts to help the student become prepared. If after reasonable efforts, the School determines that the student remains unprepared or will be unable to complete the program, or after the School determines that there are no reasonable efforts it can take, the School may deny the student readmission.

STUDENT GRIEVANCES

The Yale School of Public Health follows the University's policy that governs any case in which a student has a complaint, including but not limited to a complaint of sexual harassment or a complaint of discrimination on the basis of race, sex, color, religion, national or ethnic origin, disability, or sexual orientation, against a member of the faculty or administration of the complainant's School. Since an instructor's evaluation of the quality of a student's work is final, this procedure does not apply in any dispute about a grade assigned to a student by a member of the faculty, unless it is alleged that the determination of the grade resulted from discrimination as described above. Similarly, this procedure does not apply to any matter inherent in the academic freedom of an instructor, such as, for example, in regard to the syllabus or contents of a course of instruction. It is also not a procedure that may be used when there is a complaint about the quality of a course or the quality of instruction in a course; such concerns may be addressed directly to the department in question. The policy and procedure can be found at www.yale.edu/equalopportunity/complaint/dean-student.html. The dean's office at YSPH would make the complaint referral to the dean of the Yale School of Medicine.

Complaints of sexual misconduct, including sexual harassment and sexual assault, may be brought to a Title IX coordinator or to the University-Wide Committee on Sexual Misconduct (for inquiries or for informal or formal resolution). For more information on the University-Wide Committee on Sexual Misconduct (UWC), see Resources on Sexual Misconduct in the chapter Yale University Resources and Services. UWC procedures can be found at <http://provost.yale.edu/uwc>.

WITHDRAWAL FROM THE M.P.H. PROGRAM

A student who wishes to withdraw from the M.P.H. program must inform the associate dean for student affairs in writing and contact the Financial Aid Office. The student must also return his/her identification card and building keys to the registrar. Students wishing to reenter the program after withdrawing must reapply through the regular admissions process.

HUMAN INVESTIGATION SAFEGUARDS

All work by faculty or students undertaken anywhere that involves human subjects in ways subject to federal or Yale guidelines must be approved by the Human Investigation Committee (HIC) at Yale. Failure to obtain HIC clearance may result in dismissal from the University. Both faculty and students should be aware that these are not pro forma requirements but serious in intent, as well as consequences, if there is failure to comply.

Consultation is available during the academic year and during the summer months. Unless their work is done entirely in a laboratory with no human subject involvement, students should assume that their work does require HIC approval. It is safer to submit the forms and be informed that HIC approval is not needed, than not to submit them and later be told that they were required. Most student research receives expedited review, but some projects are reviewed by the entire HIC, a procedure taking several weeks. Thus, students are advised to submit their HIC protocols at the earliest possible time.

The student's faculty adviser and the faculty or student YSPH representatives on the HIC can assist the student in preparing an HIC protocol. Many student research projects involving human subjects also require written informed consent. Students should make sure that all informed consent procedures and forms have been approved by the HIC. Arrangements may be made for review by mail for those students outside the New Haven area.

ADDITIONAL POLICIES

Additional University policies are kept on file in the Office of Student Affairs and are available for student reference. These policies include the Policy on Freedom of Expression, the Equal Opportunity Statement, the Sexual Harassment Policy, and the Yale University AIDS Policy.

Yale University Resources and Services

A GLOBAL UNIVERSITY

The University's engagement beyond the United States dates from its earliest years. Yale has drawn students from abroad for nearly two centuries, and international issues have been represented in its curriculum for the past hundred years and more. Yale continues to evolve as a global university, educating leaders and advancing the frontiers of knowledge not simply for the United States, but for the entire world.

Today, Yale welcomes the largest number of international students and scholars in its history. The current enrollment of approximately 2,500 international students from more than 115 countries comprises 20 percent of the student body. Yale is committed to attracting the best and brightest from around the world by offering generous international financial aid packages. The number of international scholars (visiting faculty, researchers, and postdoctoral fellows) has also grown to nearly 2,500 every year.

Yale's globalization is guided by three overarching goals: prepare students for leadership and service in an increasingly interdependent world, attract the most talented students and scholars to Yale from around the world, and position Yale as a global university of consequence. These efforts are coordinated by several University-wide organizations, in addition to the work being done within the individual schools and programs.

The Whitney and Betty MacMillan Center for International and Area Studies (www.yale.edu/macmillan) is the University's focal point for teaching and research on international affairs, societies, and cultures.

The Jackson Institute for Global Affairs (<http://jackson.yale.edu>) seeks to institutionalize the teaching of global affairs throughout the University and to inspire and prepare Yale students for global citizenship and leadership.

The Office of International Affairs (<http://world.yale.edu/oia>) supports the international activities of all schools, departments, offices, centers, and organizations at Yale; promotes Yale and its faculty to international audiences; and works to increase the visibility of Yale's international activities around the globe.

The Office of International Students and Scholars (www.yale.edu/oiss) is a resource on immigration matters and hosts orientation programs and social activities for the University's international community.

The Yale Center for the Study of Globalization (www.ycsg.yale.edu) draws on the intellectual resources of the Yale community, scholars from other universities, and experts from around the world to support teaching and research on the many facets of globalization, and to enrich debate through workshops, conferences, and public programs.

The Yale World Fellows Program (<http://worldfellows.yale.edu>) hosts fifteen emerging leaders from outside the United States each year for an intensive semester of individualized research, weekly seminars, leadership training, and regular interactions with the Yale community.

The Association of Yale Alumni (www.aya.yale.edu) provides a channel for communication between the alumni and the University and oversees the direction of alumni organizations and programs around the world.

Yale's online international toolkit (<http://world-toolkit.yale.edu>) provides a central point of access to resources and assistance for Yale faculty, students, postdocs, and staff conducting international activities abroad or on campus. Additional information may be found on the "Yale and the World" Web site (<http://world.yale.edu>), including links to international initiatives across the University.

CULTURAL RESOURCES AND ATHLETIC FACILITIES

There are many ways to keep up-to-date about campus news and events. These include the YaleNews Web site, which features stories, videos, and slide-shows about Yale people and programs (<http://news.yale.edu>); the interactive Yale Calendar of Events (<http://events.yale.edu/opa>); and the University's social media channels on Facebook, Twitter, Instagram, Tumblr, LinkedIn, and YouTube.

The collections of the Yale Peabody Museum of Natural History comprise more than thirteen million specimens and artifacts in twelve curatorial divisions: anthropology, archives, botany, cryo facility, entomology, historical scientific instruments, invertebrate paleontology, invertebrate zoology, mineralogy and meteorites, paleobotany, vertebrate paleontology, and vertebrate zoology.

The Yale University Art Gallery is the oldest college art museum in the United States, having been founded in 1832 when the patriot-artist John Trumbull gave more than one hundred of his paintings to Yale College. Since then its collections have grown to more than 200,000 objects ranging in date from ancient times to the present. In addition to its world-renowned collections of American paintings and decorative arts, the gallery is noted for outstanding collections of Greek and Roman art, including artifacts from the ancient Roman city of Dura-Europos; collections of early Italian paintings; the Société Anonyme Collection of twentieth-century European and American art; modern and contemporary art and design; Asian art; African art; art of the ancient Americas; and Indo-Pacific art. In December 2012 the gallery completed a comprehensive expansion and renovation project. The expanded museum unites all three buildings—the landmark Louis Kahn building (1953), the Old Yale Art Gallery (1928), and Street Hall (1866)—into a cohesive whole with a rooftop addition by Ennead Architects (2012). The gallery is both a collecting and an educational institution, and all activities are aimed at providing an invaluable resource and experience for Yale faculty, staff, and students, as well as for the general public. For more information, please visit www.artgallery.yale.edu.

The Yale Center for British Art is home to the largest and most comprehensive collection of British paintings, sculpture, prints, drawings, rare books, and manuscripts outside the United Kingdom. Presented to the University by Paul Mellon, Yale College Class of 1929, it is housed in a landmark building by Louis I. Kahn. The center will reopen in spring 2016 with newly installed galleries and updated facilities, upon completion of the second phase of its building conservation project. For more information, feature stories, videos, and news of ongoing and upcoming programs and events, visit <http://britishart.yale.edu>.

There are more than eighty endowed lecture series held at Yale each year on subjects ranging from anatomy to theology, and including virtually all disciplines.

More than five hundred musical events take place at the University during the academic year. In addition to recitals by graduate students and faculty artists, the School of

Music presents the Philharmonia Orchestra of Yale, the Oneppo Chamber Music Series at Yale, the Duke Ellington Jazz Series, the Horowitz Piano Series, New Music New Haven, Yale Opera, and concerts at the Yale Collection of Musical Instruments, as well as performances by the professional Yale Choral Artists and the postgraduate Yale Baroque Ensemble. The Yale Summer School of Music/Norfolk Chamber Music Festival presents the New Music Workshop and Chamber Choir and Conducting Workshop along with its six-week chamber music session. Many of these concerts stream live on the School's Web site (<http://music.yale.edu>) and the Norfolk Web site (<http://norfolk.yale.edu>). Additionally, the School presents the Iseman Broadcasts of the Metropolitan Opera Live in HD free to members of the Yale community. Undergraduate organizations include the Yale Concert Band, the Yale Glee Club, the Yale Symphony Orchestra, and numerous other singing and instrumental groups. The Department of Music sponsors the Yale Collegium, Yale Baroque Opera Project, productions of new music and opera, and undergraduate recitals. The Institute of Sacred Music presents Great Organ Music at Yale, the Yale Camerata, the Yale Schola Cantorum, and many other special events.

For theatergoers, Yale and New Haven offer a wide range of dramatic productions at the University Theatre, Yale Repertory Theatre, Yale School of Drama, Yale Cabaret, Long Wharf Theatre, and Shubert Performing Arts Center.

The Payne Whitney Gymnasium is one of the most elaborate and extensive indoor athletic facilities in the world. This complex includes the 3,100-seat John J. Lee Amphitheater, the site for many indoor varsity sports contests; the Robert J. H. Kiphuth Exhibition Pool; the Brady Squash Center, a world-class facility with fifteen international-style courts; the Adrian C. Israel Fitness Center, a state-of-the-art exercise and weight-training complex; the Brooks-Dwyer Varsity Strength and Conditioning Center; the Colonel William K. Lanman, Jr. Center, a 30,000-square-foot space for recreational/intramural play and varsity team practice; the Greenberg Brothers Track, an eighth-mile indoor jogging track; the David Paterson Golf Technology Center; and other rooms devoted to fencing, gymnastics, rowing, wrestling, martial arts, general exercise, and dance. Numerous physical education classes in dance (ballet, modern, and ballroom, among others), martial arts, zumba, yoga, pilates, aerobic exercise, and sport skills are offered throughout the year. Yale undergraduates and graduate and professional school students may use the gym at no charge throughout the year. Academic term and summer memberships at reasonable fees are available for faculty, employees, postdoctoral and visiting fellows, alumni, and student spouses. Additional information is available online at <http://sportsandrecreation.yale.edu>.

During the year various recreational opportunities are available at the David S. Ingalls Rink, the McNay Family Sailing Center in Branford, the Yale Outdoor Education Center in East Lyme, the Yale Tennis Complex, and the Golf Course at Yale. Students, faculty, employees, students' spouses, and guests of the University may participate at each of these venues for a modest fee. Up-to-date information on programs, hours, and specific costs is available online at <http://sportsandrecreation.yale.edu>.

Approximately fifty club sports come under the jurisdiction of the Office of Outdoor Education and Club Sports. Most of the teams are for undergraduates, but a few are available to graduate and professional school students. Yale undergraduates, graduate and professional school students, faculty, staff, and alumni/ae may use the Yale Outdoor

Education Center (OEC), which consists of 1,500 acres surrounding a mile-long lake in East Lyme, Connecticut. The facility includes overnight cabins and campsites, a pavilion and dining hall available for group rental, and a waterfront area with supervised swimming, rowboats, canoes, stand-up paddleboards, and kayaks. Adjacent to the lake, a shaded picnic grove and gazebo are available to visitors. In another area of the property, hiking trails surround a wildlife marsh. The OEC runs seven days a week from the third week of June through Labor Day. For more information, call 203.432.2492 or visit <http://sportsandrecreation.yale.edu>.

Throughout the year, Yale graduate and professional school students have the opportunity to participate in numerous intramural sports activities. These seasonal, team-oriented activities include volleyball, soccer, and softball in the fall; basketball and volleyball in the winter; softball, soccer, ultimate, and volleyball in the spring; and softball in the summer. With few exceptions, all academic-year graduate-professional student sports activities are scheduled on weekends, and most sports activities are open to competitive, recreational, and coeducational teams. More information is available from the Intramurals Office in Payne Whitney Gymnasium, 203.432.2487, or online at <http://sportsandrecreation.yale.edu>.

HEALTH SERVICES

The Yale Health Center is located on campus at 55 Lock Street. The center is home to Yale Health, a not-for-profit, physician-led health coverage option that offers a wide variety of health care services for students and other members of the Yale community. Services include student medicine, gynecology, mental health, pediatrics, pharmacy, laboratory, radiology, a seventeen-bed inpatient care unit, a round-the-clock acute care clinic, and specialty services such as allergy, dermatology, orthopedics, and a travel clinic. Yale Health coordinates and provides payment for the services provided at the Yale Health Center, as well as for emergency treatment, off-site specialty services, inpatient hospital care, and other ancillary services. Yale Health's services are detailed in the *Yale Health Student Handbook*, available through the Yale Health Member Services Department, 203.432.0246, or online at <http://yalehealth.yale.edu/understand-your-coverage>.

Eligibility for Services

All full-time Yale degree-candidate students who are paying at least half tuition are enrolled automatically for Yale Health Basic Coverage. Yale Health Basic Coverage is offered at no charge and includes preventive health and medical services in the departments of Student Health, Gynecology, Health Education, and Mental Health & Counseling. In addition, treatment for urgent medical problems can be obtained twenty-four hours a day through Acute Care.

Students on leave of absence or on extended study and paying less than half tuition are not eligible for Yale Health Basic Coverage but may enroll in Yale Health Student Affiliate Coverage. Students enrolled in the Division of Special Registration as nondegree special students or visiting scholars are not eligible for Yale Health Basic Coverage but may enroll in the Yale Health Billed Associates Plan and pay a monthly fee. Associates must register for a minimum of one term within the first thirty days of affiliation with the University.

Students not eligible for Yale Health Basic Coverage may also use the services on a fee-for-service basis. Students who wish to be seen fee-for-service must register with the Member Services Department. Enrollment applications for the Yale Health Student Affiliate Coverage, Billed Associates Plan, or Fee-for-Service Program are available from the Member Services Department.

All students who purchase Yale Health Hospitalization/Specialty Coverage (see below) are welcome to use specialty and ancillary services at Yale Health Center. Upon referral, Yale Health will cover the cost of specialty and ancillary services for these students. Students with an alternate insurance plan should seek specialty services from a provider who accepts their alternate insurance.

Health Coverage Enrollment

The University also requires all students eligible for Yale Health Basic Coverage to have adequate hospital insurance coverage. Students may choose Yale Health Hospitalization/Specialty Coverage or elect to waive the plan if they have other hospitalization coverage, such as coverage through a spouse or parent. The waiver must be renewed annually, and it is the student's responsibility to confirm receipt of the waiver by the University's deadlines noted below.

YALE HEALTH HOSPITALIZATION/SPECIALTY COVERAGE

For a detailed explanation of this plan, which includes coverage for prescriptions, see the *Yale Health Student Handbook*, available online at <http://yalehealth.yale.edu/understand-your-coverage>.

Students are automatically enrolled and charged a fee each term on their Student Financial Services bill for Yale Health Hospitalization/Specialty Coverage. Students with no break in coverage who are enrolled during both the fall and spring terms are billed each term and are covered from August 1 through July 31. For students entering Yale for the first time, readmitted students, and students returning from a leave of absence who have not been covered during their leave, Yale Health Hospitalization/Specialty Coverage begins on the day the dormitories officially open. A student who is enrolled for the fall term only is covered for services through January 31; a student enrolled for the spring term only is covered for services through July 31.

Waiving Yale Health Hospitalization/Specialty Coverage Students are permitted to waive Yale Health Hospitalization/Specialty Coverage by completing an online waiver form at <https://www.yhpstudentwaiver.yale.edu> that demonstrates proof of alternate coverage. It is the student's responsibility to report any changes in alternate insurance coverage to the Member Services Department. Students are encouraged to review their present coverage and compare its benefits to those available under Yale Health. The waiver form must be filed annually and must be received by September 15 for the full year or fall term or by January 31 for the spring term only.

Revoking the waiver Students who waive Yale Health Hospitalization/Specialty Coverage but later wish to be covered must complete and send a form voiding their waiver to the Member Services Department by September 15 for the full year or fall term, or by January 31 for the spring term only. Students who wish to revoke their waiver during the

term may do so, provided they show proof of loss of the alternate insurance plan and enroll within thirty days of the loss of this coverage. Yale Health fees will not be prorated.

YALE HEALTH STUDENT TWO-PERSON AND FAMILY PLANS

A student may enroll his or her lawfully married spouse or civil union partner and/or legally dependent child(ren) under the age of twenty-six in one of two student dependent plans: the Two-Person Plan or the Student Family Plan. These plans include services described in both Yale Health Basic Coverage and Yale Health Hospitalization/Specialty Coverage. Coverage is not automatic, and enrollment is by application. Applications are available from the Member Services Department or can be downloaded from the Web site (<http://yalehealth.yale.edu>) and must be renewed annually. Applications must be received by September 15 for full-year or fall-term coverage, or by January 31 for spring-term coverage only.

YALE HEALTH STUDENT AFFILIATE COVERAGE

Students on leave of absence or extended study, students paying less than half tuition, or students enrolled in the Eli Whitney Program prior to September 2007 may enroll in Yale Health Student Affiliate Coverage, which includes services described in both Yale Health Basic and Yale Health Hospitalization/Specialty Coverage. Applications are available from the Member Services Department or can be downloaded from the Web site (<http://yalehealth.yale.edu>) and must be received by September 15 for full-year or fall-term coverage, or by January 31 for spring-term coverage only.

Eligibility Changes

Withdrawal A student who withdraws from the University during the first ten days of the term will be refunded the fee paid for Yale Health Hospitalization/Specialty Coverage. The student will not be eligible for any Yale Health benefits, and the student's Yale Health membership will be terminated retroactive to the beginning of the term. The medical record will be reviewed, and any services rendered and/or claims paid will be billed to the student on a fee-for-service basis. Assistance with identifying and locating alternative sources of medical care may be available from the Care Management Department at Yale Health. At all other times, a student who withdraws from the University will be covered by Yale Health for thirty days following the date of withdrawal. Fees will not be prorated or refunded. Students who withdraw are not eligible to enroll in Yale Health Student Affiliate Coverage. Regardless of enrollment in Yale Health Hospitalization/Specialty Coverage, students who withdraw will have access to services available under Yale Health Basic Coverage (including Student Health, Athletic Medicine, Mental Health & Counseling, and Care Management) during these thirty days to the extent necessary for a coordinated transition of care.

Leaves of absence Students who are granted a leave of absence are eligible to purchase Yale Health Student Affiliate Coverage during the term(s) of the leave. If the leave occurs during the term, Yale Health Hospitalization/Specialty Coverage will end on the date the leave is granted, and students may enroll in Yale Health Student Affiliate Coverage. Students must enroll in Affiliate Coverage prior to the beginning of the term during which

the leave is taken or within thirty days of the start of the leave. Fees paid for Yale Health Hospitalization/Specialty Coverage will be applied toward the cost of Affiliate Coverage. Coverage is not automatic, and enrollment forms are available at the Member Services Department or can be downloaded from the Web site (<http://yalehealth.yale.edu>). Fees will not be prorated or refunded.

Extended study or reduced tuition Students who are granted extended study status or pay less than half tuition are not eligible for Yale Health Hospitalization/Specialty Coverage. They may purchase Yale Health Student Affiliate Coverage during the term(s) of extended study. This plan includes services described in both Yale Health Basic and Yale Health Hospitalization/Specialty Coverage. Coverage is not automatic, and enrollment forms are available at the Member Services Department or can be downloaded from the Web site (<http://yalehealth.yale.edu>). Students must complete an enrollment application for the plan prior to September 15 for the full year or fall term, or by January 31 for the spring term only.

For a full description of the services and benefits provided by Yale Health, please refer to the *Yale Health Student Handbook*, available from the Member Services Department, 203.432.0246, 55 Lock Street, PO Box 208237, New Haven CT 06520-8237.

Required Immunizations

Measles (rubeola), German measles (rubella), and mumps All students who were born after January 1, 1957, are required to provide proof of immunization against measles (rubeola), German measles (rubella), and mumps. Connecticut state law requires two doses of measles vaccine. The first dose must have been given on or after January 1, 1980, *and* after the student's first birthday; the second dose must have been given at least thirty (30) days after the first dose. Connecticut state law requires proof of two doses of rubella vaccine administered on or after January 1, 1980, *and* after the student's first birthday. Connecticut state law requires proof of two mumps vaccine immunizations administered on or after January 1, 1980, *and* after the student's first birthday; the second dose must have been given at least thirty (30) days after the first dose. The law applies to all students unless they present (a) a certificate from a physician stating that such immunization is contraindicated, (b) a statement that such immunization would be contrary to the student's religious beliefs, or (c) documentation of a positive blood titer for measles, rubella, and mumps. In addition to vaccination, all health care students should provide blood titers for measles, rubella, and mumps.

Meningitis All students living in on-campus housing must be vaccinated against meningitis. The vaccine must have been received after January 1, 2011. Students who are not compliant with this state law will not be permitted to register for classes or move into the dormitories for the fall term, 2015. Please note that the State of Connecticut does not require this vaccine for students who intend to reside off campus.

Varicella (chicken pox) All students are required to provide proof of immunization against varicella. Connecticut state law requires two doses of varicella vaccine. The first dose must have been given on or after the student's first birthday; the second dose must

have been given at least twenty-eight (28) days after the first dose. Documentation of a positive blood titer for varicella is also acceptable. History of varicella disease is not acceptable.

TB screening The University requires tuberculosis screening for all incoming students. For students in the School of Public Health, this entails providing proof of a PPD done within six months of the start of the fall term, or a chest X-ray for individuals known to be PPD positive.

In addition to University requirements, all School of Public Health students must also meet immunization requirements of the various hospitals in which they will work. Yale-New Haven Hospital requires that, before beginning any clinical work, all students with negative serology be successfully vaccinated against hepatitis B and must ascertain that students are immune to mumps, rubeola, rubella, and varicella. Those refusing the hepatitis B vaccine must do so in writing at the time of matriculation. Students must show evidence that they have received a tetanus-diphtheria-pertussis booster within the past ten years.

Any students who will be traveling abroad should make an appointment in the Travel Clinic at Yale Health at least six to eight weeks prior to departure. It is especially important that students notify the Travel Clinic of travel activities that include working in areas where they might encounter blood or fluid exposure. Such students will be given a supply of antiretroviral medication at no charge. They will also receive instructions about how to handle possible exposure.

RESIDENCE AND DINING FACILITIES

Edward S. Harkness Memorial Hall

Harkness Hall, located only steps away from the School of Medicine and Yale-New Haven Hospital, houses students from the Schools of Medicine, Nursing, and Public Health, the Physician Associate program, and other graduate and professional schools at Yale. Residents of Harkness Hall live in a secure building with single-occupancy bedrooms. Yale administrative offices occupy the first through third floors of the building. The great advantages of living in Harkness Hall are its close proximity to classes, and the opportunity it provides in bringing together students from the various medical-related fields in a relaxed social setting. For additional information visit <http://gradhousing.yale.edu>.

Dining Services

The newly renovated Marigolds Dining, located in Harkness Hall at the School of Medicine, is open from 7:30 a.m. to 7 p.m., Monday through Friday. The menu has been revised to enhance convenience and choice, with a customizable salad, soup, and rice bar utilizing local and seasonal ingredients; specialty coffees and artisan pastries; an expanded grab-and-go selection of prepackaged salads, sandwiches, and entrées; and a daily hot food option. For additional information visit www.yale.edu/dining/locations/marigolds.

RESOURCE OFFICE ON DISABILITIES

The Resource Office on Disabilities facilitates accommodations for undergraduate and graduate and professional school students with disabilities who register with and have appropriate documentation on file in the Resource Office. Early planning is critical. Documentation may be submitted to the Resource Office even though a specific accommodation request is not anticipated at the time of registration. It is recommended that matriculating students in need of disability-related course accommodations at Yale University contact the Resource Office by June 15. Special requests for University housing need to be made in the housing application. Returning students must contact the Resource Office at the beginning of each term to arrange for course and exam accommodations.

The Resource Office also provides assistance to students with temporary disabilities. General informational inquiries are welcome from students and members of the Yale community and from the public. The mailing address is Resource Office on Disabilities, Yale University, PO Box 208305, New Haven CT 06520-8305. The Resource Office is located at 35 Broadway (rear entrance), Room 222. Office hours are Monday through Friday, 8:30 a.m. to 4:30 p.m. Voice callers may reach staff at 203.432.2324; fax at 203.432.8250. The Resource Office may also be reached by e-mail (anthony.kulikowski@yale.edu) or through its Web site (www.yale.edu/rod).

RESOURCES ON SEXUAL MISCONDUCT

Yale University is committed to maintaining and strengthening an educational, employment, and living environment founded on civility and mutual respect. Sexual misconduct is antithetical to the standards and ideals of our community, and it is a violation of Yale policy and the disciplinary regulations of Yale College and the graduate and professional schools.

Sexual misconduct incorporates a range of behaviors including sexual assault, sexual harassment, intimate partner violence, stalking, voyeurism, and any other conduct of a sexual nature that is nonconsensual, or has the purpose or effect of threatening, intimidating, or coercing a person. Sexual activity requires consent, which is defined as voluntary, positive agreement between the participants to engage in specific sexual activity. Violations of Yale's Policy on Teacher-Student Consensual Relations also constitute sexual misconduct.

Yale aims to eradicate sexual misconduct through education, training, clear policies, and serious consequences for violations of these policies. In addition to being subject to University disciplinary action, many forms of sexual misconduct are prohibited by Connecticut and federal law and may lead to civil liability or criminal prosecution. Yale provides a range of services, resources, and mechanisms for victims of sexual misconduct. The options for undergraduate, graduate, and professional school students are described at <http://smr.yale.edu>.

SHARE: Information, Advocacy, and Support

55 Lock Street, Lower Level
 Office hours: 9 a.m.–5 p.m., M–F
 24/7 hotline: 203.432.2000
<http://sharecenter.yale.edu>

SHARE, the Sexual Harassment and Assault Response and Education Center, has trained counselors available at any time of day or night via its direct hotline, as well as drop-in counseling on weekdays during regular business hours. SHARE is available to members of the Yale community who wish to discuss any experience of sexual misconduct involving themselves or someone they care about. SHARE services are confidential and can be anonymous when desired. SHARE can provide professional help with medical and health issues (including accompanying students to the hospital), as well as advice and assistance with contacting police and/or initiating a formal or informal complaint, and it offers ongoing counseling and support. SHARE works closely with the University-Wide Committee on Sexual Misconduct, the Title IX coordinators, the Yale Police Department, and other campus resources.

If you wish to make use of SHARE's services, you can call the crisis number (203.432.2000) at any time for a phone consultation or to set up an in-person appointment. You may also drop in on weekdays during regular business hours. Some legal and medical options are time-sensitive, so if you have been assaulted, we encourage you to call SHARE and/or the Yale Police as soon as possible. Counselors can talk with you over the telephone or meet you in person at Acute Care in the Yale Health Center or at the Yale-New Haven Emergency Room. If it is not an acute situation and you would like to contact the SHARE staff during regular business hours, you can contact Carole Goldberg, the director of SHARE (203.432.0310, carole.goldberg@yale.edu), Jennifer Czincz, assistant director (203.432.2610, jennifer.czincz@yale.edu), Amy Myers (203.436.8197, amy.myers@yale.edu), or John Criscuolo (203.494.6247, john.criscuolo@yale.edu).

Title IX Coordinators

<http://provost.yale.edu/title-ix>

Title IX of the Education Amendments of 1972 protects people from sex discrimination in educational programs and activities at institutions that receive federal funding. Sex discrimination includes sexual harassment, sexual assault, and other forms of misconduct. The University is committed to providing an environment free from discrimination on the basis of sex.

Each school, including Yale College, has assigned a senior administrator to act as a deputy Title IX coordinator, reporting to Stephanie Spangler, Deputy Provost for Health Affairs and Academic Integrity and the University Title IX Coordinator. Coordinators provide information, track and resolve complaints, and address issues relating to gender-based discrimination and sexual misconduct within their respective schools. Coordinators are knowledgeable about, and will provide information on, all options for complaint resolution, and can initiate institutional action when necessary. Discussions with a Title IX coordinator will be treated confidentially; at times, the coordinator may

need to consult with other administrators or take action in the interest of safety. The coordinators also work closely with the SHARE Center, the University-Wide Committee on Sexual Misconduct, and the Yale Police Department.

University-Wide Committee on Sexual Misconduct

203.432.4449 (business hours)

<http://provost.yale.edu/uwc>

The University-Wide Committee on Sexual Misconduct (UWC) is an internal disciplinary board for complaints of sexual misconduct available to students, faculty, and staff across the University, as described in the committee's procedures. The UWC provides an accessible, representative, and trained body to fairly and expeditiously address formal and informal complaints of sexual misconduct. UWC members can answer informal inquiries about procedures and the University definition of sexual misconduct. Operated from the Provost's Office, the UWC is comprised of faculty, administrative, and student representatives from across the University. In cases where formal resolution is sought, investigations are conducted by professional, independent fact finders.

Yale Police Department

101 Ashmun Street

24/7 hotline: 203.432.4400

<http://publicsafety.yale.edu/police/sensitive-crimes-support>

The Yale Police Department (YPD) operates 24/7 and is comprised of highly trained, professional officers. The YPD can provide information on available victims' assistance services and also has the capacity to perform full criminal investigations. If you wish to speak with Sergeant Marnie Robbins Hoffman, the Sensitive Crimes & Support coordinator, she can be reached at 203.432.9547 during business hours or via e-mail at marnie.robbs@yale.edu. Informational sessions are available with the Sensitive Crimes & Support coordinator to discuss safety planning, available options, etc. The YPD works closely with the New Haven State's Attorney, the SHARE Center, the University's Title IX coordinators, and various other departments within the University. Talking to the YPD does not commit you to submitting evidence or pressing charges; with few exceptions, all decisions about how to proceed are up to you.

OFFICE OF INTERNATIONAL STUDENTS AND SCHOLARS

The Office of International Students and Scholars (OISS) coordinates services and support for Yale's 5,000 international students, faculty, staff, and their dependents. OISS staff offers assistance with issues related to employment, immigration, and personal and cultural adjustment, as well as serves as a source of general information about living at Yale and in New Haven. As Yale University's representative for immigration concerns, OISS provides assistance to students, faculty, and staff on how to obtain and maintain legal nonimmigrant status in the United States. All international students and

scholars must register with OISS as soon as they arrive at Yale; see <http://oiss.yale.edu/information-new-yalies>.

OISS programs, like the Community Friends hosting program, daily English conversation groups, U.S. culture workshops and discussions, bus trips, and social events, provide an opportunity to meet members of Yale's international community and become acquainted with the many resources of Yale University and New Haven. Spouses and partners of Yale students and scholars will want to get involved with the International Spouses and Partners at Yale (ISPY), which organizes a variety of programs.

The OISS Web site (<http://oiss.yale.edu>) provides useful information to students and scholars prior to and upon arrival in New Haven, as well as throughout their stay at Yale. International students, scholars, and their families and partners can connect with OISS and the Yale international community virtually through several listservs and Facebook.

OISS is housed in the International Center for Yale Students and Scholars, which serves as a welcoming venue for students and scholars who want to peruse resource materials, check their e-mail, and meet up with a friend or colleague. Open until 9 p.m. on weekdays during the academic year, the center—located at 421 Temple Street, across the street from Helen Hadley Hall—also provides meeting space for student groups and a venue for events organized by both student groups and University departments. For more information about reserving space at the center, send a message to oiss@yale.edu or call 203.432.2305. For information about the center, visit <http://oiss.yale.edu/about/international-center>.

SECURITY

Yale University Security maintains a presence throughout the Medical Center area and across the Yale campus on a 24/7 basis, both through uniformed security officers and centrally monitored electronic security systems that include video cameras, card readers, intercoms, emergency blue telephones, and intrusion alarm systems.

The Yale Security Department partners with the Yale Police Department by patrolling parking facilities, pedestrian areas, and buildings using marked vehicles, bicycles, and foot patrols. Security officers are also available to assist with lockouts, perform walking escorts, and provide safe rides.

The University Security Department can be reached twenty-four hours a day, seven days a week, by calling 203.785.5555. For additional information regarding public safety at Yale, or to request additional security services for special events, please visit our Web site at <http://publicsafety.yale.edu>.

YSPH Resources for Students

OFFICE OF STUDENT AFFAIRS

47 College Street, 203.785.6260
Frank Grosso, Associate Dean
Sarah Harmon, Associate Director/Registrar

The Office of Student Affairs offers services and provides resources designed to enhance student life at YSPH. The associate dean has primary responsibility for the student experience at YSPH, represents the interests of all students to the faculty, and participates in policy decisions for the school. Dean Grosso and Sarah Harmon are available to discuss academic, extracurricular, or personal issues with YSPH students. The Office of Student Affairs also coordinates orientation, Commencement, and other student programs, and serves as the administrative liaison with YSPH student organizations. The goal of the office is to ensure that every YSPH student is productively engaged in both academic and nonacademic aspects of school life.

CAREER MANAGEMENT CENTER

47 College Street, 203.785.2827, 203.785.4285
Felicia Spencer, Director

The Career Management Center assists students in developing, managing, and implementing career plans and strategies through a number of programs and resources.

Career Counseling

The Career Management Center advises students on a wide range of career development issues, including but not limited to creating effective résumés, honing interview skills, exploring summer internship options, and discussing opportunities for post-graduation jobs or study.

Professional Skills Seminars

The Career Management Center administers a series of seminars to help prepare students to successfully manage all aspects of a job or internship search as well as equip them with the skills and knowledge to succeed in their chosen career paths. Students are trained in mock interviewing, public speaking, networking with alumni, and business communications.

Recruiting and Job Information

The Career Management Center works to attract a variety of organizations seeking to hire public health professionals. The YSPH CareerBoard, a Web-based recruitment tool, is a centralized source for posting job, internship, and fellowship opportunities.

Internship

The summer internship between the first and second years is an important learning experience, providing students with an opportunity to explore or confirm a particular career interest. Students are expected to perform full-time work for ten to twelve weeks in a public health setting, domestically or globally. The Career Management Center helps students identify internship opportunities through on-campus recruiting, job postings, and alumni and faculty contacts.

Career Trips

The Career Management Center sponsors and organizes career trips to Washington, D.C., and New York City to help introduce students to the broad array of public health opportunities in the public, private, and nonprofit sectors.

LIBRARY SERVICES

Students at Yale University have access to one of the largest library collections in the world. YSPH students have privileges that include free interlibrary loan services and access to the extensive collections in all of the Yale libraries. In particular, the Harvey Cushing/John Hay Whitney Medical Library, Lillian Goldman Library at Yale Law School, and Center for Science and Social Science Information have important print and electronic resources that address the multidisciplinary information needs of the YSPH student.

OFFICE OF THE REGISTRAR

47 College Street, 203.785.6260
Sarah Harmon, Registrar

The registrar's office prepares course schedules, enrolls and registers students, maintains student records, and monitors academic progress. The following can be obtained from the registrar's office:

- Proof of student status. The registrar can provide a letter attesting to your student status and process loan deferment forms.
- Information on degree requirements.
- Transcripts. Copies of transcripts must be requested from the registrar's office. The transcript request form is available online at <http://publichealth.yale.edu/about/gateways/students>. Two days should be allowed for the processing of requests. There is no charge for an official transcript. By law, the registrar may only release YSPH transcripts. Prior transcripts and recommendations included in a student's application to YSPH must be obtained from their original source.
- Lockers. A limited number of lockers are available for student use during the academic year. For a locker assignment students should contact the registrar's office. Students are responsible for providing a lock and for the contents of the assigned locker.
- Nondisclosure of personal information forms.

OFFICE OF ALUMNI AFFAIRS

47 College Street, 203.785.6245

Martin Klein, Associate Dean, Development and External Affairs

The YSPH Office of Alumni Affairs strengthens institutional relationships and develops and implements programs that sustain an active alumni network. The office, in collaboration with the Association of Yale Alumni in Public Health (AYAPH), facilitates the participation of more than 4,000 alumni in the life of the School and provides a voice for alumni, strengthens alumni connections with the School, and promotes alumni networking. AYAPH is led by a group of dedicated alumni volunteers who serve on its board of directors.

Alumni Day, held annually in New Haven, features a symposium on a timely public health issue, as well as an alumni awards luncheon that recognizes outstanding contributions of our alumni to the field of public health and/or in service to YSPH. Another popular alumni gathering is held in conjunction with the annual meeting of the American Public Health Association (APHA). With APHA hosting its annual meeting in a different U.S. city each year, the schedule ensures participation of graduates located throughout the United States.

YSPH has a strong alumni network, and in addition to participating in formal alumni events, graduates of YSPH routinely assist students in their career paths and networking activities. Alumni are also essential to the practice curriculum through teaching, serving as preceptors, and providing applied research sites for projects and theses.

OFFICE OF PUBLIC HEALTH PRACTICE

135 College Street

Rafael Pérez-Escamilla, Ph.D., Director

Elaine O'Keefe, Executive Director

The Office of Public Health Practice was established in 2008 to enhance public health practice education, applied research, and community-university health partnerships. The office is a bridge to domestic and international agencies engaged in public health work and serves as an on-site resource for students seeking meaningful learning experiences in the world of public health practice. Its services include helping M.P.H. students select appropriate summer internship placements and assuring that they have multiple opportunities to apply theoretical classroom knowledge to genuine public health issues through practice-oriented courses that are offered during the academic year in addition to the summer internship program.

Medical Center Resources and Programs

OFFICE OF MULTICULTURAL AFFAIRS

Forrester A. Lee, M.D., Associate Dean for Multicultural Affairs
<http://medicine.yale.edu/education/omca>

OFFICE OF THE OMBUDSPERSON

Merle Waxman, M.A., Ombudsperson
<http://medicine.yale.edu/ombuds>

OFFICE FOR WOMEN IN MEDICINE

Merle Waxman, M.A., Director
<http://medicine.yale.edu/owm>

Merle Waxman, Director of the Office for Women in Medicine, is the Title IX coordinator for the Yale School of Medicine. She can be contacted at 203.785.4680, 203.737.4100, or merle.waxman@yale.edu. The Title IX coordinator for the Yale School of Public Health is Melinda Pettigrew, Associate Professor of Epidemiology and Associate Dean of Academic Affairs. She can be contacted at 203.737.7667 or melinda.pettigrew@yale.edu.

INTERDISCIPLINARY RESEARCH AND SPECIAL PROGRAMS

Cancer Prevention and Control Research Program

<http://yalecancercenter.org/research/programs/prevention>

CARE (Community Alliance for Research and Engagement)

<http://care.yale.edu>

Center for Infectious Disease Modeling and Analysis

<http://cidma.yale.edu>

Center for Perinatal, Pediatric, and Environmental Epidemiology

www.yale.edu/cppee

CIRA (Center for Interdisciplinary Research on AIDS)

<http://cira.yale.edu>

Collaborative Center for Statistics in Science

<http://c2s2.yale.edu>

Connecticut Emerging Infections Program

<http://publichealth.yale.edu/eip>

Institute for Social and Policy Studies

<http://isps.yale.edu/>

Keck Biotechnology Resource Laboratory

<http://medicine.yale.edu/keck>

John B. Pierce Laboratory

<http://jbpierce.org>

Yale Center for Analytical Sciences

<http://ycas.yale.edu>

Yale Global Health Initiative

<http://globalhealth.yale.edu>

Yale Global Health Leadership Institute

<http://ghli.yale.edu>

Yale-Griffin Prevention Research Center

www.yalegriffinprc.org

Yale Program on Aging

<http://medicine.yale.edu/intmed/geriatrics/research>

Student Organizations and Committees

STUDENT GOVERNMENT

Student Association of Yale School of Public Health

SAYPH is organized by YSPH students for YSPH students. SAYPH works to enhance the educational experience of each student at the School by sponsoring educational and social activities, providing a forum for students' ideas and concerns, and acting as a liaison with the administration. Through SAYPH students get involved in many areas, including:

- New student orientation.
- Lecture series, films, colloquia, and other programs of interest to the public health community.
- Recruitment of new students to YSPH.
- Community service.
- Social events.
- Commencement activities.

SAYPH is headed by an Executive Committee consisting of a president, a social committee chair, professional development committee chair, community service chair, and communications chair. There are at least two departmental representatives acting as liaisons between students and the faculty and administration.

UNIVERSITY COMMITTEES

Graduate Health Advocate Program

Graduate representatives from each graduate and professional school within Yale University participate in the Graduate Health Advocate Program, which is sponsored by Yale Health's Health Education Office/AIDS Resource & Counseling Center. The Graduate Health Advocate Program links graduate students at Yale with the resources of the Health Education Office. The program sponsors events such as AIDS Awareness Month and World AIDS Day. In addition to HIV prevention, the program addresses other health issues such as smoking and substance abuse. Programs and activities reflect student concerns and student involvement. Types of activities include conducting ongoing prevention activities, informal/educational displays in school dining halls, and fund-raising to benefit local AIDS charities.

Graduate and Professional Student Senate (GPSS)

The Graduate and Professional Student Senate (GPSS or "Yale Senate") is composed of elected representatives from each of the thirteen graduate and professional schools. Any student in these schools is eligible to run for a senate seat during fall elections. Senate meetings occur on alternating Thursdays and are open to the entire graduate and professional school community, as well as representatives from the Yale administration. The senate advocates for student concerns and advancement by serving as a liaison between students and Yale administration, faculty, and officers. It also facilitates social interaction among graduate and professional students and works with local groups and initiatives to

provide opportunities for students to give back to the community. The senate supervises the Graduate and Professional Student Center at Yale (GPSCY), at 204 York Street, which provides meeting space and funding for student organizations and is home to Gryphon's Pub. For more information, please visit <http://gpss.yale.edu>.

SPECIAL INTEREST GROUPS

Students in the School of Public Health participate in a diverse range of special interest groups, from Yale chapters of professional associations to student-run clinics and other public service organizations. For additional information, see Student Organizations at <http://publichealth.yale.edu/about/gateways/students>.

Appendix I:

YSPH Practice Requirement Guidelines

All M.P.H. candidates must complete a practicum to integrate classroom learning with real-life experience in a public health work environment, which allows them to learn from professionals in the field. M.P.H. students may fulfill the Public Health Practice Requirement by one of the following means:

1. Completing an appropriate public health summer internship – the preferred method for fulfilling the practicum requirement, as it offers a sustained and concentrated course of experiential learning.
2. Completing EPH 542b, Practice-Based Community Health Research.
3. Completing EPH 500b, Public Health Practicum, offered to second-year students and one-year professional students only.
4. Completing HPM 555a,b, Health Policy and Health Care Management Practicum, for one or two terms.
5. Completing CDE 596b/LAW 21416, Global Health Justice Practicum.

Advanced Professional M.P.H. students are not required to complete a summer internship and must fulfill their practicum requirement during the academic year by taking one of the courses listed above.

In planning your practicum, please refer to the following guidelines, which apply to domestic and/or global experiential learning placements that qualify as meeting the M.P.H. practicum requirement, including the summer internship and other community agency assignments that are part of approved practice courses.

1. Practicum may occur in a wide variety of settings at the local, regional, national, or international level but must be outwardly focused on a public health problem or issue. Acceptable venues would include governmental entities as well as nongovernmental and private-sector organizations with a public health component such as pharmaceutical companies, hospitals, managed care/health maintenance organizations, and consulting firms.
2. Practicum affords opportunity to participate in the full spectrum of defining, analyzing, and addressing a real-life public health problem or issue, either directly or through observation, consultation with others working on the problem, participation in relevant meetings or activities, and pertinent reading.
3. Practicum entails one or more of the following roles:
 - Assessment, monitoring, and/or surveillance of population health indicators, social determinants of health, inequities associated with race/ethnicity and socioeconomic status, environmental/occupational hazards and exposures, and other public health issues;
 - Participating in the development and/or execution of applied public health research in the biological, environmental, and social/behavioral realms that has an immediate impact on public health, including translational, evaluation, and epidemiological research efforts that contribute to the evidence-base and efficacy of public health practice;

- Planning, designing, implementing, and evaluating public health interventions;
 - Developing disease prevention and health promotion, media advocacy, or risk communication materials;
 - Developing, implementing, and evaluating public health laws, regulations, and policy;
 - Participating in administrative/management activities of governmental and nongovernmental public health agencies and/or health service delivery systems such as hospitals or community health centers. Activities could include quality improvement, organizational analysis and restructuring processes, strategic and business planning, organizational policy and protocol, financial management, budgeting and reimbursement processes, preparation of internal or external reports, human resources management, workforce development and credentialing, and addressing regulatory compliance issues such as audits and accreditation processes;
 - Supporting the development and goals of public health coalitions through community organizing and advocacy efforts, needs assessments, strategic and participatory community planning, leadership development, and assisting with the development and implementation of community health improvement plans that respond to local needs and priorities.
4. Practicum integrates public health theory, knowledge, and skills, and applies and reinforces the competencies in M.P.H. course work.
 5. Practicum typically aligns with the student's area of specialization.
 6. The practicum project and student role are appropriate for the M.P.H. level.
 7. The practicum agency and preceptor have requisite population health orientation, public health expertise, and infrastructure to support M.P.H.-level student learning experience.
 8. The practicum has deliverables of tangible value to the mission of the placement agency/site.

Appendix II: Thesis Guidelines

TYPES OF THESES

The following seven types of theses are acceptable:

Investigative Thesis

The investigative thesis takes an in-depth look at a specific health problem or topic, describing its public health importance and analyzing it from a disciplined perspective. This thesis should include the following:

1. Definition of the problem;
2. Presentation of the study population and the methods by which data were acquired;
3. Analysis of the results;
4. Discussion of the implications of the results;
5. Recommendations.

Research Study Demonstrating Mastery of Methodology

This type of thesis requires sophisticated analysis and application. Consequently, students should be sure of their readiness to undertake it. This thesis should include the following:

1. Statement of methodological problem;
2. Comparison of available solutions, discussing the advantages and disadvantages of each;
3. Either (a) Choice and application of one of the available solutions, or (b) Development of a new solution with discussion of the advantages and disadvantages of that solution.

Administrative Case Study

An administrative thesis defines, describes, analyzes, and interprets an actual administrative, problem-solving activity undertaken during a student's field work. A variety of standard case study formats may be employed. An administrative case study thesis should be planned in advance with appropriate techniques for systematic observation and recording of data as the project progresses. This thesis usually includes the following:

1. Definition of the problem;
2. Description of setting, structure, function, and relationships;
3. Relationship of student to problem (authority and accountability);
4. Procedural description (case description, process, outcome);
5. Analysis of events with reference to theory;
6. Assessment of the administrative solution.

Program Analysis, Evaluation, or Projection

This type of thesis examines either retrospectively or prospectively some particular health problem. This thesis should include the following:

1. Definition of the problem that the program addresses;
2. Statement of program goals and objectives;
3. Specification of available data such as the following:
 - a. Target population (characteristics, distribution, levels of protection, morbidity);
 - b. Historical information, goals, politics;
 - c. Resources and use of resources (acceptability, accessibility);
 - d. Basis of intervention, data on knowledge, attitudes and practices;
 - e. Cost analysis;
 - f. Specification of further data needs.

Special Project

This type of thesis incorporates a product useful in the teaching or practice of public health such as a curriculum, syllabus, or course for a school program or on-the-job training; specific educational aids (perhaps a computer-assisted learning experience, a programmed instruction course, or a training manual); a movie, videotape, or slide package; a pamphlet for use in health information; a set of formal administrative guidelines to implement a law or administrative decision; or architectural plans for a health facility.

In addition to the product, the student must produce a written analysis that includes the following:

1. A rationale for the product and the anticipated audience/users;
2. Review of relevant literature;
3. Reasons for the selection of the chosen medium/method, including relevant theory;
4. Proposal for method to evaluate the product;
5. Discussion of the limitations of the product.

The special project may require review by the Committee on Academic Progress.

THESIS ADVISERS (READERS)

The type of thesis, choice of topic, and details of methodology are the joint responsibility of the student and the thesis adviser (first reader). The thesis adviser is determined by mutual consent between the reader and the student and may or may not be the student's faculty adviser. The thesis adviser must have a faculty appointment in the Yale School of Public Health.

The first reader must have a faculty appointment at YSPH. Acceptable appointments are: (1) ladder faculty at the rank of assistant professor and above, and (2) non-ladder faculty at the rank of associate research scientist and above. The faculty member can have either a primary or secondary appointment at YSPH. Students must request approval for first readers who have other types of non-ladder faculty appointments at YSPH (e.g., lecturer, instructor, etc.). To request approval, students need to provide the registrar with a copy of the first reader's CV along with the thesis reader form for approval by the Committee on Academic Progress. Students unsure of whether someone has an appointment at YSPH should consult the comprehensive list of all faculty members, by department, at the front of the YSPH Bulletin.

The second reader should have a faculty appointment at YSPH, Yale University, or another outside academic institution. Students must request approval for second readers whose faculty appointment is outside of Yale or who do not have a faculty appointment at an academic institution. To do so, students must provide the registrar with a copy of the second reader's CV along with the thesis reader form for approval by the Committee on Academic Progress.

TIMELINE FOR M.P.H. THESIS

- September** Divisional meetings to review specific thesis requirements and timelines
October 30 Thesis reader forms (signed by both readers) due to registrar
May 1 Deadline for final grades from both readers and submission of electronic copy

ORGANIZATION

The thesis must be assembled as follows:

- A. Title Page (Title cannot exceed 60 characters)
- B. A one-page, double-spaced abstract
 The abstract is the final statement on the problem addressed by the thesis and should incorporate the most mature insights attained.
- C. Acknowledgments (if desired)
- D. Table of Contents
- E. List of Tables (if any)
- F. List of Figures (if any)
- G. Body of the Thesis

The following organization of the body of the thesis is recommended:

1. Introduction
 - a. Brief statement of specific objectives of the investigation
 - b. Statement of general problem addressed by the thesis
 - c. Elaboration of objectives and/or hypotheses, including the relation to the general problem
2. Review of Studies Relevant to the Problem
3. Research Design
 - a. Specific research design and method
 - b. Reasons for selection
 - c. Method of analysis, including justification for statistical tests
4. Presentation and Analysis of Findings
 This is the major portion of the thesis. The significance of the findings should be discussed and an assessment made of their applicability to current theory and practice. Analysis and discussion may be presented together in one chapter or separately in two chapters.
5. Conclusions
 - a. Summary of findings
 - b. Limitations of findings and other limitations of the study
 - c. Conclusions based on the study
 - d. Relevant recommendations for program development or further research

H. References

A list of the pertinent references consulted in preparing the thesis should be included. Any standard and consistent format for presentation of footnotes and references is acceptable.

I. Appendix or Appendices

ELECTRONIC SUBMISSION OF THESIS

The final, completed version of the thesis must be submitted electronically, by midnight on May 1, at www.etsadmin.com/publichealthyle.

DEAN'S PRIZE FOR OUTSTANDING THESIS

The Dean's Prize for Outstanding Thesis may be awarded to a small number (maximum of four) of students for extraordinary academic achievement on the M.P.H. thesis. Thesis advisers who recognize a student's work as truly exceptional may nominate the student for this prize. Winners are announced at the YSPH Commencement ceremony.

THESIS PENDING (DELAYED SUBMISSION OF THESIS)

Students who have not received final grades from both readers and submitted their thesis electronically by May 1 will be considered "thesis pending" and will receive a grade of "Incomplete" for the thesis. Students who are "thesis pending" will not be allowed to participate in the Commencement ceremony and will not receive the M.P.H. degree until all requirements are complete.

Students who are "thesis pending" are given one year to complete the thesis without penalty. At the end of the one-year period, the grade of "Incomplete" will be changed to a grade of "F" if the thesis has not been submitted. The student will be required to register for the thesis course and pay the per course tuition charge (\$3,000 per course) in order to submit the completed thesis. All M.P.H. degree requirements including the thesis must be completed within five years of the student's date of matriculation.

PUBLICATION GUIDELINES

The thesis may be published independently. It also may be published under joint or multiple authorship if advisers or agency personnel have contributed significantly to the final product. Significance is interpreted to mean contributions such as expanding theory or techniques of analysis in ways beyond the usual role of an adviser. Supplying the database does not entitle the supplier to authorship. When students work on sponsored research, the thesis adviser and the student should sign a letter of agreement on funding, use of database or materials, deadlines, publication rights, and authorship before work on the thesis begins.

PUBLICATION PROCESS FOR THE M.P.H. THESIS

The following are publication guidelines that are intended to avoid miscommunication and differential expectations of authorship between students and thesis advisers.

1. When the prospectus is submitted, thesis advisers will discuss publication with students, including desire for publication, description of the publication process, possible venues, authors, determination of authorship order, and logistics.
2. If the thesis adviser provides the data, then the adviser should create a written publication/data sharing agreement. The agreement should be signed by both the adviser and the student before work on the thesis is started. The agreement should include at the minimum:
 - Process for order of authorship
 - Timeline for publication and process if timeline is not met
 - Process and expectations of revisions
3. If the thesis adviser does not provide the data, then the thesis adviser should work with the student to draft a similar document to be completed and signed by the student and the primary data source. Guidelines should be consistent with any established policies of the primary data source. This should be done whether or not the thesis adviser is included as an author on the publication.
4. In general, if the manuscript has not been submitted for publication within a year after graduation, the thesis adviser will have the right to prepare the manuscript for publication.

The Work of Yale University

The work of Yale University is carried on in the following schools:

Yale College Est. 1701. Courses in humanities, social sciences, natural sciences, mathematical and computer sciences, and engineering. Bachelor of Arts (B.A.), Bachelor of Science (B.S.).

For additional information, please visit <http://admissions.yale.edu>, e-mail student.questions@yale.edu, or call 203.432.9300. Postal correspondence should be directed to Office of Undergraduate Admissions, Yale University, PO Box 208234, New Haven CT 06520-8234.

Graduate School of Arts and Sciences Est. 1847. Courses for college graduates. Master of Advanced Study (M.A.S.), Master of Arts (M.A.), Master of Science (M.S.), Master of Philosophy (M.Phil.), Doctor of Philosophy (Ph.D.).

For additional information, please visit <http://gsas.yale.edu>, e-mail graduate.admissions@yale.edu, or call the Office of Graduate Admissions at 203.432.2771. Postal correspondence should be directed to Office of Graduate Admissions, Yale Graduate School of Arts and Sciences, PO Box 208323, New Haven CT 06520-8323.

School of Medicine Est. 1810. Courses for college graduates and students who have completed requisite training in approved institutions. Doctor of Medicine (M.D.). Post-graduate study in the basic sciences and clinical subjects. Five-year combined program leading to Doctor of Medicine and Master of Health Science (M.D./M.H.S.). Combined program with the Graduate School of Arts and Sciences leading to Doctor of Medicine and Doctor of Philosophy (M.D./Ph.D.). Master of Medical Science (M.M.Sc.) from the Physician Associate Program.

For additional information, please visit <http://medicine.yale.edu/education/admissions>, e-mail medical.admissions@yale.edu, or call the Office of Admissions at 203.785.2643. Postal correspondence should be directed to Office of Admissions, Yale School of Medicine, 367 Cedar Street, New Haven CT 06510.

Divinity School Est. 1822. Courses for college graduates. Master of Divinity (M.Div.), Master of Arts in Religion (M.A.R.). Individuals with an M.Div. degree may apply for the program leading to the degree of Master of Sacred Theology (S.T.M.).

For additional information, please visit <http://divinity.yale.edu>, e-mail divinity.admissions@yale.edu, or call the Admissions Office at 203.432.5360. Postal correspondence should be directed to Admissions Office, Yale Divinity School, 409 Prospect Street, New Haven CT 06511.

Law School Est. 1824. Courses for college graduates. Juris Doctor (J.D.). For additional information, please visit www.law.yale.edu, e-mail admissions.law@yale.edu, or call the Admissions Office at 203.432.4995. Postal correspondence should be directed to Admissions Office, Yale Law School, PO Box 208215, New Haven CT 06520-8215.

Graduate Programs: Master of Laws (LL.M.), Doctor of the Science of Law (J.S.D.), Master of Studies in Law (M.S.L.). Doctor of Philosophy (Ph.D.) awarded by the Graduate School of Arts and Sciences. For additional information, please visit www.law.yale.edu, e-mail gradpro.law@yale.edu, or call the Graduate Programs Office at

203.432.1696. Postal correspondence should be directed to Graduate Programs, Yale Law School, PO Box 208215, New Haven CT 06520-8215.

School of Engineering & Applied Science Est. 1852. Courses for college graduates. Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) awarded by the Graduate School of Arts and Sciences.

For additional information, please visit <http://seas.yale.edu>, e-mail grad.engineering@yale.edu, or call 203.432.4252. Postal correspondence should be directed to Office of Graduate Studies, Yale School of Engineering & Applied Science, PO Box 208267, New Haven CT 06520-8267.

School of Art Est. 1869. Professional courses for college and art school graduates. Master of Fine Arts (M.F.A.).

For additional information, please visit <http://art.yale.edu>, e-mail artschool.info@yale.edu, or call the Office of Academic Affairs at 203.432.2600. Postal correspondence should be directed to Office of Academic Affairs, Yale School of Art, PO Box 208339, New Haven CT 06520-8339.

School of Music Est. 1894. Graduate professional studies in performance, composition, and conducting. Certificate in Performance, Master of Music (M.M.), Master of Musical Arts (M.M.A.), Artist Diploma, Doctor of Musical Arts (D.M.A.).

For additional information, please visit <http://music.yale.edu>, e-mail gradmusic.admissions@yale.edu, or call the Office of Admissions at 203.432.4155. Postal correspondence should be directed to Yale School of Music, PO Box 208246, New Haven CT 06520-8246.

School of Forestry & Environmental Studies Est. 1900. Courses for college graduates. Master of Forestry (M.F.), Master of Forest Science (M.F.S.), Master of Environmental Science (M.E.Sc.), Master of Environmental Management (M.E.M.). Doctor of Philosophy (Ph.D.) awarded by the Graduate School of Arts and Sciences.

For additional information, please visit <http://environment.yale.edu>, e-mail fesinfo@yale.edu, or call the Office of Admissions at 800.825.0330. Postal correspondence should be directed to Office of Admissions, Yale School of Forestry & Environmental Studies, 195 Prospect Street, New Haven CT 06511.

School of Public Health Est. 1915. Courses for college graduates. Master of Public Health (M.P.H.). Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) awarded by the Graduate School of Arts and Sciences.

For additional information, please visit <http://publichealth.yale.edu>, e-mail ysph.admissions@yale.edu, or call the Admissions Office at 203.785.2844.

School of Architecture Est. 1916. Courses for college graduates. Professional degree: Master of Architecture (M.Arch.); nonprofessional degree: Master of Environmental Design (M.E.D.). Doctor of Philosophy (Ph.D.) awarded by the Graduate School of Arts and Sciences.

For additional information, please visit <http://architecture.yale.edu>, e-mail gradarch.admissions@yale.edu, or call 203.432.2296. Postal correspondence should be directed to the Yale School of Architecture, PO Box 208242, New Haven CT 06520-8242.

School of Nursing Est. 1923. Courses for college graduates. Master of Science in Nursing (M.S.N.), Post Master's Certificate, Doctor of Nursing Practice (D.N.P.). Doctor of Philosophy (Ph.D.) awarded by the Graduate School of Arts and Sciences.

For additional information, please visit <http://nursing.yale.edu> or call 203.785.2389. Postal correspondence should be directed to Yale School of Nursing, Yale University West Campus, PO Box 27399, West Haven CT 06516-7399.

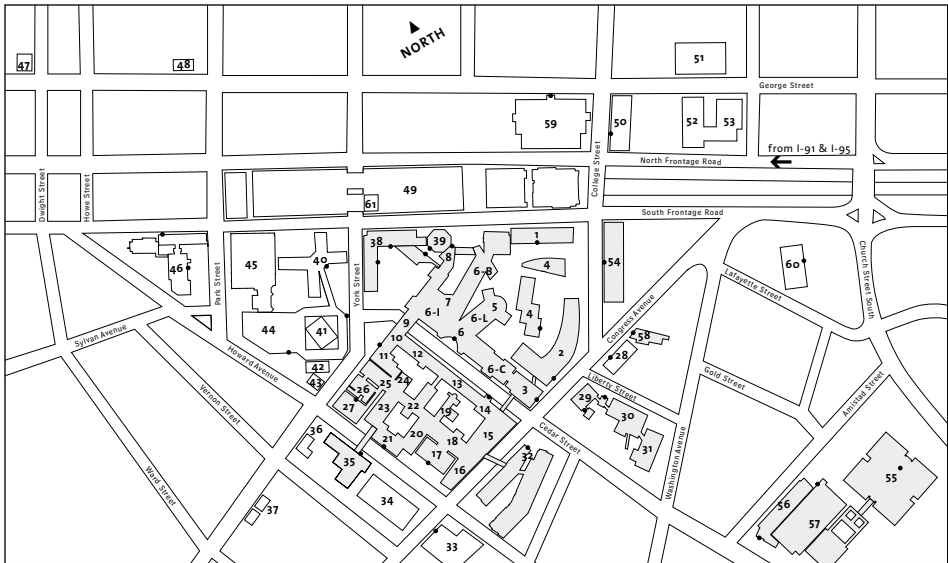
School of Drama Est. 1925. Courses for college graduates and certificate students. Master of Fine Arts (M.F.A.), Certificate in Drama, One-year Technical Internship (Certificate), Doctor of Fine Arts (D.F.A.).

For additional information, please visit <http://drama.yale.edu>, e-mail ysd.admissions@yale.edu, or call the Registrar/Admissions Office at 203.432.1507. Postal correspondence should be directed to Yale School of Drama, PO Box 208325, New Haven CT 06520-8325.

School of Management Est. 1976. Courses for college graduates. Master of Business Administration (M.B.A.), Master of Advanced Management (M.A.M.). Doctor of Philosophy (Ph.D.) awarded by the Graduate School of Arts and Sciences.

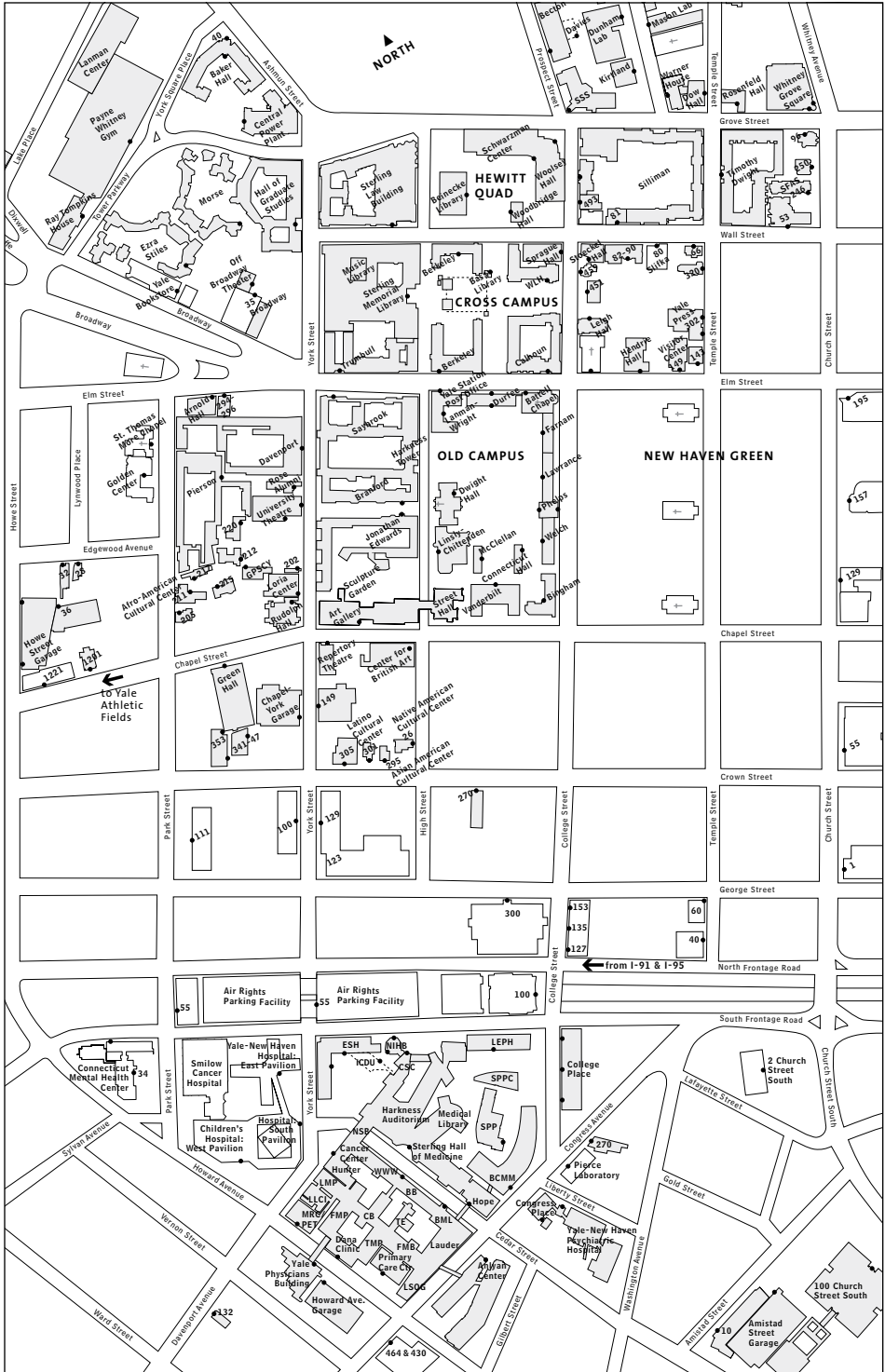
For additional information, please visit <http://som.yale.edu>. Postal correspondence should be directed to Yale School of Management, PO Box 208200, New Haven CT 06520-8200.

YALE MEDICAL CENTER BUILDINGS AND ADDRESSES



1. Laboratory of Epidemiology and Public Health, 60 College St.
2. Boyer Center for Molecular Medicine
3. Jane Ellen Hope Building
4. Sterling Power Plant and Sterling Power Plant Co-Gen
5. Harvey Cushing/John Hay Whitney Medical Library
6. Sterling Hall of Medicine, 333 Cedar St.
Wings: B, C, I & L
7. Mary S. Harkness Memorial Auditorium
8. Child Study Center
9. Nathan Smith Building (Bridge)
10. Yale Cancer Center
11. Hunter Building, 15 York St.
12. William Wirt Winchester Building
13. Boardman Building, 330 Cedar St.
14. Brady Memorial Laboratory, 310 Cedar St.
15. Lauder Hall
16. Laboratory for Surgery, Obstetrics and Gynecology
17. Primary Care Center
18. Farnam Memorial Building
19. Tompkins East
20. Tompkins Memorial Pavilion
21. Charles A. Dana Building, 789 Howard Ave.
22. Clinic Building
23. Fitkin Memorial Pavilion
24. Fitkin Amphitheater
25. Laboratory for Medicine and Pediatrics
26. Lippard Laboratory of Clinical Investigation
27. P.E.T. Center
28. John B. Pierce Laboratory, 290 Congress Ave.
29. Congress Place, 301 Cedar St.
30. Yale-New Haven Psychiatric Hospital 2, 184 Liberty St.
31. Yale-New Haven Psychiatric Hospital 3, 184 Liberty St.
32. Anlyan Center for Medical Research and Education, 300 Cedar St.
33. 430 and 464 Congress Ave. and 726 Howard Ave.
34. **Howard Ave. Garage**
35. Yale Physicians Building, 800 Howard Ave.
36. 110 Davenport Ave. (YNHH Day Care Center)
37. 132–138 Davenport Ave. (Lead Program)
38. Edward S. Harkness Memorial Hall A and D, 367 Cedar St.
39. Neison and Irving Harris Building, Child Study Center, 230 S. Frontage Rd.
40. East Pavilion, 20 York St.
(Yale-New Haven Hospital Main Entrance)
41. South Pavilion, 20 York St.
42. **Emergency Services Parking**
43. **Children's Hospital Parking Garage**
44. Children's Hospital (West Pavilion)
45. Smilow Cancer Hospital, 20 York St.
46. Connecticut Mental Health Center
47. Ronald McDonald House, 501 George St.
48. 425 George St.
49. **Air Rights Parking Garage**
50. 127, 135, and 153 College St.
51. New Haven Hotel, 229 George St.
52. **Temple Garage**
53. Temple Medical Center, 40–60 Temple St.
54. College Place, 47 College St.
55. Medical Center South, 100 Church St. South
56. 10 Amistad St.
57. **Amistad Garage**
58. 270 Congress Ave.
59. 300 George St.
60. 2 Church St. South
61. 55 York St.

YALE UNIVERSITY CAMPUS SOUTH & YALE MEDICAL CENTER



The University is committed to basing judgments concerning the admission, education, and employment of individuals upon their qualifications and abilities and affirmatively seeks to attract to its faculty, staff, and student body qualified persons of diverse backgrounds. In accordance with this policy and as delineated by federal and Connecticut law, Yale does not discriminate in admissions, educational programs, or employment against any individual on account of that individual's sex, race, color, religion, age, disability, status as a protected veteran, or national or ethnic origin; nor does Yale discriminate on the basis of sexual orientation or gender identity or expression.

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Title IX of the Education Amendments of 1972 protects people from sex discrimination in educational programs and activities at institutions that receive federal financial assistance. Questions regarding Title IX may be referred to the University's Title IX Coordinator, Stephanie Spangler, at 203.432.4446 or at titleix@yale.edu, or to the U.S. Department of Education, Office for Civil Rights, 8th Floor, 5 Post Office Square, Boston MA 02109-3921; tel. 617.289.0111, fax 617.289.0150, TDD 800.877.8339, or ocr.boston@ed.gov.

In accordance with federal and state law, the University maintains information on security policies and procedures and prepares an annual campus security and fire safety report containing three years' worth of campus crime statistics and security policy statements, fire safety information, and a description of where students, faculty, and staff should go to report crimes. The fire safety section of the annual report contains information on current fire safety practices and any fires that occurred within on-campus student housing facilities. Upon request to the Office of the Deputy Vice President for Human Resources and Administration, PO Box 208322, 2 Whitney Avenue, Suite 810, New Haven CT 06520-8322, 203.432.8049, the University will provide this information to any applicant for admission, or prospective students and employees may visit <http://publicsafety.yale.edu>.

In accordance with federal law, the University prepares an annual report on participation rates, financial support, and other information regarding men's and women's intercollegiate athletic programs. Upon request to the Director of Athletics, PO Box 208216, New Haven CT 06520-8216, 203.432.1414, the University will provide its annual report to any student or prospective student. The Equity in Athletics Disclosure Act (EADA) report is also available online at <http://ope.ed.gov/athletics>.

For all other information relating to the School of Public Health, please telephone 203.785.6260; consult the Web site, <http://publichealth.yale.edu>; or write to the Office of Student Affairs, School of Public Health, 47 College Street, Suite 108, New Haven CT 06510.

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