DEPARTMENTAL REQUIREMENTS

The specific requirements with regard to courses, qualifying examinations, and admission to candidacy set by Public Health 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 the School of Public Health, 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 and research institutes such as the National Institute of Health, where they engage in biomedical and statistical research and education. In addition, graduates have pursued careers in the pharmaceutical industry, in which they make critical contributions to therapeutic developments. Graduates are also employed in fields such as technology and finance, where they are involved in data science developments and applications.

Required Coursework

Ph.D. students in Biostatistics have the choice of two pathways: the Biostatistics Standard Pathway and the Biostatistics Implementation and Prevention Science Methods Pathway. Students in the Standard Pathway are required to take a minimum of fifteen courses, and students in the Implementation and Prevention Science Methods Pathway are required to take a minimum of fourteen courses (not including BIS 525, BIS 526, BIS 699, and PUBH 600). All first-year students must participate in an online Public Health Primer course offered the summer before their first term. Course substitutions must be identified and approved by the student's adviser and the DGS. Students funded by specific fellowships may be subject to additional requirements and should discuss this with their adviser.

Required courses (or their equivalents) for both pathways are:

BIS 525	Seminar in Biostatistics and Journal Club [1] [1]	0
BIS 526	Seminar in Biostatistics and Journal Club	0
BIS 610	Applied Area Readings for Qualifying Exams	1

BIS 623	Advanced Regression Models	1
or S&DS 6120	Linear Models	
BIS 628	Longitudinal and Multilevel Data Analysis	1
BIS 643	Theory of Survival Analysis	1
BIS 691	Theory of Generalized Linear Models	1
BIS 699	Summer Internship in Biostatistical Research[1]	0
PUBH 508	Foundations of Epidemiology and Public Health	1
PUBH 600	Research Ethics and Responsibility[1]	0
S&DS 6100	Statistical Inference[2]	1

[1] Courses do not count toward the total number of courses required (fourteen for Implementation and Prevention Science Methods Pathway students and fifteen for Standard Pathway students)

[2] Course offered in the Graduate School of Arts and Sciences

In consultation with their academic adviser students in the Standard Pathway will choose a minimum of eight additional electives that will best prepare them for dissertation work.

Students in the Implementation and Prevention Science Methods Pathway will also be required to complete BIS 537, Statistical Methods for Causal Inference; BIS 629, Advanced Methods for Implementation and Prevention Science; BIS 631, Advanced Topics in Causal Inference Methods; and EMD 533, Implementation Science. In consultation with their adviser, students must also choose a minimum of three additional electives.

Recommended electives for the Implementation and Prevention Science Methods pathway are:

BIS 536	Measurement Error and Missing Data	1
BIS 567	Bayesian Statistics	1
BIS 646	Nonparametric Statistical Methods and Their Applications	1
CDE 516	Principles of Epidemiology II	1
CDE 534	Applied Analytic Methods in Epidemiology	1
EMD 538	Quantitative Methods for Infectious Disease Epidemiology[1]	1
HPM 570	Cost-Effectiveness Analysis and Decision-Making	1
HPM 575	Evaluation of Global Health Policies and Programs	1
HPM 586	Microeconomics for Health Policy and Health Management	1
HPM 587	Advanced Health Economics[1,2]	1
MGT 611	Policy Modeling	4
SBS 541	Community Health Program Evaluation	1
SBS 574	Developing a Health Promotion and Disease Prevention Intervention[1]	1
SBS 580	Qualitative Research Methods in Public Health[1,3]	1
S&DS 5410	Probability Theory	1
or S&DS 6000	Advanced Probability	

S&DS 5650	Introductory Machine Learning[3]	1
or S&DS 6650	Intermediate Machine Learning	

[1] This course is strongly recommended.

[2] Course is offered by the School of Management

[3] Course offered in the Graduate School of Arts and Sciences

Qualifying Examination

The qualifying examination has two parts. The first is a written, in-class examination that demonstrates competence with the use of statistical principles to develop methods of application; this exam is divided into two sections: a statistical theory examination and a biostatistics examination. The second involves the critical review of statistical literature, report writing, and oral defense of 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

Through both required and elective courses, students gain actual experience with various aspects of research, including literature review, development of research questions, experimental design, data collection and management, data analysis and interpretation, and preparation of a manuscript and grant. 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 699. During the summer following the first year of coursework, candidates are required to take a research rotation (BIS 699) 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

Doctoral students in Chronic Disease Epidemiology use primarily quantitative research methods to identify risk factors for chronic diseases in populations. The department is best known for research in the epidemiology of cancer, heart disease and stroke, aging, life course epidemiology (including perinatal and pediatric epidemiology), and genetics. Collaboration is key in epidemiology. Thus, students in the department often work on projects with other departments within YSPH, within the Schools of Medicine and Nursing, and across Yale University, resulting in numerous opportunities for creating an experientially rich doctoral experience. All candidates must become

proficient in statistical analysis, research methods, and the application of epidemiology to the field in which they have special interest.

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 Coursework

Students in the CDE department are expected to complete a minimum of seventeen courses (not including PUBH 600) from the following courses or their equivalents. All first-year students must participate in an online Public Health Primer course offered the summer before their first term. Course substitutions must be identified and approved by the student's adviser and the DGS. 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.

BIS 505	Biostatistics in Public Health II[1]	1
CDE 516	Principles of Epidemiology II	1
CDE 534	Applied Analytic Methods in Epidemiology	1
CDE/EHS 566	Causal Inference Methods in Public Health Research	1
CDE 610	Applied Area Readings for Qualifying Exams	1
CDE 617	Developing a Research Proposal[2]	1
CDE 650	Introduction to Evidence-Based Medicine and Health Care	1
EHS/CDE 502	Physiology for Public Health	1
PUBH 508	Foundations of Epidemiology and Public Health	1
PUBH 600	Research Ethics and Responsibility[3]	0

[1] In consultation with their advisor, students may take a substitute course.

[2] CDE 617 is not required of students funded by the Yale AIDS Prevention Training Program. Those students must take an additional course to meet the seventeen-course requirement.

[3] This course does not count towards the seventeen required courses.

In consultation with their academic adviser, students also choose three graduate-level course units in biostatistics (or equivalent substitutions approved by the student's adviser).

Students also choose five additional electives that will best prepare them for their dissertation research.

Qualifying Examination

The CDE qualifying examination is composed of two parts: the written dissertation proposal and an oral presentation of the proposal.

The student's Dissertation Advisory Committee (DAC) chair will administer the qualifying examination by the end of the fall semester of the student's third year (second year for a student who enters with advanced standing). Before the

examination, the Graduate Studies Executive Committee must review and approve the DAC, the specific aims, and a working title for the dissertation proposal. Detailed information regarding the CDE qualifying examination is available from the CDE representative to the Graduate Studies Executive Committee (GSEC).

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.

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.

Students must complete a minimum of twelve courses (not including EHS 525, EHS 526, and PUBH 600). All first-year students must participate in an online Public Health Primer course offered the summer before their first term. Course substitutions must be identified and approved by the student's adviser and the DGS.

Required Coursework

CORE REQUIREMENTS

CDE 617	Developing a Research Proposal	1
EHS 503	Public Health Toxicology	1
EHS 508	Environmental and Occupational Exposure Science [1]	1
EHS 525	Seminar and Journal Club in Environmental Health [1]	0
EHS 526	Seminar and Journal Club in Environmental Health	0
EHS 560	Methods in Climate Epidemiology	1

or EHS 566	Causal Inference Methods in Public Health Research	
EHS 619	Research Rotation	1
EHS 620	Research Rotation	1
PUBH 505	Biostatistics in Public Health	1
PUBH 508	Foundations of Epidemiology and Public Health[1]	1
PUBH 600	Research Ethics and Responsibility	0

[1] These courses do not count toward the minimum of twelve courses.

Suggested electives (minimum of four required)

BIS 505	Biostatistics in Public Health II	1
BIS 623	Advanced Regression Models	1
BIS 628	Longitudinal and Multilevel Data Analysis	1
CDE 516	Principles of Epidemiology II	1
CDE/EHS 520	Case-Based Learning for Genetic x Environmental Diseases in the Modern Genomic Era	1
CDE 534	Applied Analytic Methods in Epidemiology[1]	1
CDE/EHS 566	Causal Inference Methods in Public Health Research	1
EHS/CDE 502	Physiology for Public Health	1
EHS 511	Principles of Risk Assessment	1
EHS 530	Our Air, Our Health	1
EHS/EMD 537	Water, Sanitation, and Global Health	1
EHS 547	Climate Change and Public Health[1]	1
EHS 560	Methods in Climate Epidemiology	1
EHS/CDE 563	Biomarkers of Exposure, Effect, and Susceptibility in the Epidemiology of Noncommunicable Disease	1
EHS 567	Fundamentals of Green Chemistry and Green Engineering	1
EHS 568	Introduction to GIS for Public Health	1
EHS 581	Public Health Emergencies: Disaster Planning and Response[2]	1
ENV 755	Modeling Geographic Space[2]	3
ENV 756	Modeling Geographic Objects	3

[1] Cannot be counted as an elective if taken as a requirement.

[2] These courses are offered in the School of the Environment.

Qualifying Examination

A qualifying examination that will serve as the formal test prior to admission to candidacy for the Ph.D. program will be administered after completion of twelve course units and generally before the end of the second year. The student's DAC will administer this qualifying examination. The exam consists of an evaluation of a written prospectus and an oral presentation and defense of the research proposal. The proposal will be on the student's thesis project, written in NRSA format. At least two weeks before the oral qualifying examination, the written proposal should be sent to the Graduate Studies Executive Committee representative, and they will

distribute the prospectus to EHS faculty. The student will present the thesis proposal to the dissertation advisory committee and EHS faculty at an agreed-upon date/time. The possible outcomes are (a) pass unconditionally with minor revisions, (b) pass conditionally, with further study suggested (or required) in one or more areas, or (c) fail, with or without the option to retake the examination after the areas of concern have been addressed. For those who pass conditionally, the faculty will review once the concerns have been addressed. Not meeting the conditions will result in failure in the program. More details regarding the EHS qualifying examinations can be obtained from the EHS representative to the Graduate Studies Executive Committee.

Research Requirements

Two research rotations during the first academic year in EHS laboratories able to accommodate students are required of each student, one in the fall term and one in the spring term. In consultation with the student's academic adviser, an additional rotation may be offered during the summer between the first and second year. Research rotations will be available for both "dry" (i.e., statistical analysis) and "wet" (i.e., bench) laboratory research. The student will meet with the EHS graduate faculty member at the beginning of the rotation for an explanation of the goals and expectations of a student in the laboratory. The student will become familiar with the research models, approaches, and methods utilized by the research group through interactions with other laboratory/research personnel and from laboratory manuscripts. The student is expected to spend at least fifteen hours per week working in the laboratory or research group and to present a rotation seminar at the end of the rotation period.

In years three and beyond, students are required to present at least twice a year to their DAC and annually to the rest of the Ph.D. students and faculty in a departmental retreat or during an EHS Doctoral Research-in-Progress seminar.

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 and includes in-depth ecological, pathogenic, clinical, cellular, immunological, and molecular aspects of infectious diseases, their causative agents, vertebrate hosts, and vectors.

Required Coursework

Courses in biostatistics, epidemiology, and microbiology are strongly recommended. The specific courses taken depend on the background of individual students and their stated research interests. An individual program that includes courses, seminars, and research rotations is developed by the student and the student's 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. These research rotations (EMD 670, EMD 671, and EMD 672) are graded and account for three of the required ten courses. In addition, students are required to complete

coursework in epidemiology (PUBH 508 or CDE 516) and in research proposal development CDE 617. All first-year students must participate in an online Public Health Primer course offered the summer before their first term. Students with prior graduate-level epidemiology courses may be exempt from coursework in epidemiology.

Students are required to take a minimum of ten courses (not including PUBH 600). Course substitutions must be identified and approved by the student's adviser and the DGS.

CORE REQUIREMENTS

CDE 617	Developing a Research Proposal	1
EMD 670	Advanced Research Laboratories	1
EMD 671	Advanced Research Laboratories	1
EMD 672	Advanced Research Laboratories	1
PUBH 508	Foundations of Epidemiology and Public Health	1
or CDE 516	Principles of Epidemiology II [1]	
PUBH 600	Research Ethics and Responsibility	0

[1] This course does not count toward the minimum of ten courses.

SUGGESTED COURSES

The following courses are suggested as appropriate for Ph.D. students in EMD. However, in consultation with the student's adviser, other courses in YSPH or in other departments may also be appropriate.

BIS 537	Statistical Methods for Causal Inference	1
BIS 567	Bayesian Statistics	1
CDE/EHS 566	Causal Inference Methods in Public Health Research	1
EHS 568	Introduction to GIS for Public Health	1
EMD 531	Genomic Epidemiology of Infectious Diseases	1
EMD 533	Implementation Science	1
EMD 538	Quantitative Methods for Infectious Disease Epidemiology	1
EMD 539	Introduction to the Analysis and Interpretation of Public Health Surveillance Data	1
EMD 546	Vaccines and Vaccine-Preventable Diseases	1
EMD 550	Epidemiology and Control of Vector Borne Diseases	1
EMD 553	Transmission Dynamic Models for Understanding Infectious Diseases	1
EMD 567	Tackling the Big Three: Malaria, TB, and HIV in Resource-Limited Settings	1
EMD 582	Political Epidemiology	1
HPM 570	Cost-Effectiveness Analysis and Decision-Making	1
S&DS 5300	Data Exploration and Analysis	1
S&DS 5380	Probability and Statistics	1
S&DS 5630	Multivariate Statistical Methods for the Social Sciences	1

[1] These courses are offered in the Graduate School of Arts and Sciences.

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 that will expand the dissertation topic to subject matters not covered in 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.

Research Requirements

Three research training modules are required of all students, and each term involves a different investigator. These are offered as formal courses (EMD 670, EMD 671, EMD 672). 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.

HEALTH POLICY AND MANAGEMENT

The doctoral program in the Health Policy and Management (HPM) Department emphasizes application of theory and methods to important policy and management topics. It is designed to educate students to apply knowledge derived from public health, social sciences (political science, organizational behavior, and microeconomics), and other areas to crucial public health topics. The program educates students to conduct research on the forefront of health services research; management of health care organizations; policy analysis; and health economic issues. Students are prepared for academic, research, and policy careers in both the public and the private sectors in public health.

Specializations

Disciplinary background and methods are important to meaningful application of theory and methods to key public health topics. Students in HPM will be required to develop expertise in one of the following specializations: Economics; Organizational Theory and Management; or Political and Policy Analysis.

Mentoring and Advising

A hallmark of our program is the low student-to-faculty ratio and the high student and faculty interaction. Students work closely with their adviser and with a number of faculty with common interests, either a specific topic or a policy area. The adviser or set of advisers conducts independent readings with the student in preparation for

the dissertation. In addition, students will typically work on research with faculty from both inside the department and from around the university throughout the student's time in the program; these faculty provide an informal network for supplementary mentoring. The student's DAC works closely with the student and has informal as well as formal meetings.

Coursework

Students are required to complete the following coursework (or the equivalent in the topic areas covered in these courses). This course listing represents a suggested general program of study, but the specifics of course requirements are adapted to the particular interests and professional aspirations of each student. The standard number of courses taken is twelve (excluding PUBH 600, HPM 617, and HPM 618), with the option of obtaining credits for previous courses. With the approval of the academic adviser and the DGS, alternative courses that better suit the needs of the student may satisfy the coursework 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 coursework or alternative courses. If so, the student should apply for a course waiver through the graduate school. HPM students can only waive up to three of the twelve courses. Additionally, all first-year students must participate in an online Public Health Primer course the summer before their first term.

CORE REQUIREMENTS[1] (ALL STUDENTS)

HPM 610	Applied Area Readings	1
HPM 617	Colloquium in Health Services Research[1]	0
HPM 618	Colloquium in Health Services Research	0
PUBH 508	Foundations of Epidemiology and Public Health	1
PUBH 600	Research Ethics and Responsibility	0

[1] These courses do not count toward the standard number of twelve courses.

Methods and Statistics

Minimum of four courses. Suggested courses are:

BIS 623	Advanced Regression Models	1
BIS 628	Longitudinal and Multilevel Data Analysis	1
ECON 5556	Topics in Empirical Economics and Public Policy	1
ECON 5558	Econometrics	1
MGMT 7202	Applied Empirical Methods	1
PLSC 5000	Foundations of Statistical Inference	1
PLSC 5030	Causal Inference	1
PLSC 5120	The Design and Analysis of Randomized Field Experiments in Political Science	1
PLSC 5270	From Concept to Measure: Empirical Inquiry in Social Science	1
SOCY 5610	Introduction to Methods in Quantitative Sociology	1
SOCY 5620	Intermediate Methods in Quantitative Sociology	1

SOCY 5670	AI in Social Science Methods[1]	1
SOCY 5900	Mixed Methods Research[1]	1
S&DS 5630	Multivariate Statistical Methods for the Social Sciences[1]	1
S&DS 5650	Introductory Machine Learning[1]	1

[1] Course offered in the Graduate School of Arts and Sciences.

Health Policy and Management

The following course, with Ph.D. readings, is required.

HPM 514	Health Politics, Governance, and Policy	1

AREA OF SPECIALIZATION COURSE REQUIREMENTS

A minimum of four courses, all with Ph.D. readings, are required in the student's area of specialization.

Economics

Four courses are required. These must include the following:

ECON 5545	Microeconomics[1]	1
ECON 5558	Econometrics[1,2]	1

[1] Course offered in the Graduate School of Arts and Sciences.

[2] ECON 5558 may count as a methods/statistics course or as a specialization course, but not both.

Students are required to take courses (or their equivalents) in graduate level microeconomics (i.e.,ECON 5545, Microeconomics and ECON 5558, Econometrics, listed above) and a year-long sequence in econometrics, selected in consultation with the student's adviser (this will count towards the required Methods and Statistics courses). 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 (other courses may be substituted in consultation with the student's adviser). Suggested courses are:

Behavioral Economics		
MGMT 7304	Foundations of Behavioral Economics[1]	1
PSYC 5530	Behavioral Decision-Making I: Choice[1]	1
Industrial Organization		
ECON 6600	Industrial Organization I[1]	1
ECON 6601	Industrial Organization II[1]	1
Labor Economics		
ECON 6630	Labor Economics[1]	1
ECON 6631	Labor Economics	1
Public Finance		
ECON 5556	Topics in Empirical Economics and Public Policy[1]	1

ECON 6680	Public Finance I[1]	1
ECON 6681	Public Finance II[1]	1

[1] Course offered in the Graduate School of Arts and Sciences.

Organizational Theory and Management

Four courses are required, selected in consultation with the student's adviser.

Political and Policy Analysis

Four courses are required, selected in consultation with the student's adviser. Suggested courses are:

PLSC 8000	Introduction to American Politics[1]	1
PLSC 8010	Political Preferences and American Political Behavior[1]	1
PLSC 8030	American Politics III: Institutions	1
PLSC 8100	Political Preferences and American Political Behavior[1]	1
PLSC 8240	American Political Thought[1]	1
PLSC 8410	Democracy and Bureaucracy[1]	1
PLSC 8650	Policy Making under Separation of Powers[1]	1
PLSC 8690	Current Topics in American Politics[1]	1

[1] Course offered in the Graduate School of Arts and Sciences.

Students will also choose one additional elective that will best prepare them for their dissertation research.

Qualifying Exams

Students take qualifying exams in each of these three areas: (1) health policy and management, (2) empirical analysis and/or statistics, and (3) the student's area of specialization. Typically these are taken in the summer after two years of coursework. Details about the Health Policy and Management qualifying examination can be obtained from the HPM representative to the GSEC.

Research Requirements

All students are expected to develop their research skills through working with HPM faculty on research. Typically, students will work on a variety of projects with multiple faculty members, beginning during their initial year in the program. Students are expected to attend the departmental research seminar for faculty and are also expected to attend the doctoral research seminar.

Dissertation

Students' doctoral dissertations should have a strong disciplinary base, often with an interdisciplinary approach, applying theory and rigorous methods to a significant public health policy or management topic.

SOCIAL AND BEHAVIORAL SCIENCES

The Social and Behavioral Sciences (SBS) department aims to understand and improve health equity, both domestically and globally. Students will have the opportunity

to follow the Maternal Child Health Promotion Pathway within SBS (or follow the traditional SBS curriculum). SBS provides instruction in the theory and methods of the social and behavioral sciences that emphasize individual, interpersonal, community, and structural 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, with a focus on 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 focuses on integrating methods from epidemiology and the social sciences, training scientists with a broad skill set that allows them to answer a host of complex research questions. The department has numerous research strengths, including in HIV/AIDS, aging health, community-engaged health research, maternal child health, mental health, health equity and disparities, and stigma prevention and health.

Required Coursework

Students in SBS or the Maternal Child Health Promotion Pathway are expected to complete a minimum of fifteen courses (not including PUBH 600) from the following courses or their equivalents. All first-year students must participate in an online Public Health Primer course the summer before their first term. Course substitutions must be identified and approved by the student's adviser and the DGS. 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.

CORE REQUIREMENTS (ALL STUDENTS)

CDE 617	Developing a Research Proposal[1]	1
PUBH 508	Foundations of Epidemiology and Public Health	1
PUBH 600	Research Ethics and Responsibility[2]	0
SBS 574	Developing a Health Promotion and Disease Prevention Intervention	1
or SBS 541	Community Health Program Evaluation	
or SBS 593	Community-Based Participatory Research in Public Health	
SBS 580	Qualitative Research Methods in Public Health	1
SBS 610	Applied Area Readings for Qualifying Exams	1
SBS 699	Advanced Topics in Social and Behavioral Sciences	1

[1] CDE 617 is not required of students funded by the Yale AIDS Prevention Training Program. Those students must take an additional elective in order to meet the fifteen-course requirement.

[2] This course does not count toward the minimum of fifteen courses.

In consultation with their dissertation adviser, SBS students (not in the Maternal and Child Health Promotion Pathway) will choose three advanced-level statistics or methods courses from Biostatistics, Psychology, Political Science, Sociology, Anthropology, or Statistics and Data Science. Two of these courses must be from the following list:

BIS 621	Regression Models for Public Health	1
or BIS 623	Advanced Regression Models	
CDE 566	Causal Inference Methods in Public Health Research	1
or BIS 537	Statistical Methods for Causal Inference	
EMD 582	Political Epidemiology	1
or BIS 628	Longitudinal and Multilevel Data Analysis	
or S&DS 5630	Multivariate Statistical Methods for the Social Sciences	

One additional statistics or methods course can be chosen in consultation with the dissertation advisor based on the student's research plans.

In addition, students must take six electives that will best prepare them for their dissertation research.

Maternal and Child Health (MCH) Promotion Pathway

Students who choose this pathway must take the following three courses in addition to the core requirements listed for all SBS students.

EMD 533	Implementation Science	1
SBS 560	Sexual and Reproductive Health	1
SBS 594	Maternal-Child Public Health Nutrition	1

MCH Promotion Pathway students are required to take three electives from this list and three additional electives chosen in consultation with their adviser:

BIS 505	Biostatistics in Public Health II	1
BIS 621	Regression Models for Public Health	1
or BIS 623	Advanced Regression Models	
BIS 628	Longitudinal and Multilevel Data Analysis	1
BIS 630	Applied Survival Analysis	1
CDE 516	Principles of Epidemiology II	1
CDE 566	Causal Inference Methods in Public Health Research	1
or EMD 582	Political Epidemiology	
HPM 575	Evaluation of Global Health Policies and Programs	1
PUBH 505	Biostatistics in Public Health	1
S&DS 5630	Multivariate Statistical Methods for the Social Sciences	1

Qualifying Examination

The qualifying examinations in SBS have two primary components: (1) A written draft of the dissertation prospectus (2) an oral presentation of the proposal. The expected timeline for SBS Qualifying exams ranges from the end of the spring term in the second year to the end of the spring term in the third year. Students will submit their written dissertation prospectus to the SBS Chair and a date for the oral presentation will be scheduled approximately three weeks after the student submits to the SBS Chair.

Detailed information regarding the SBS Qualifying Examinations can be obtained from the GSEC Departmental Representative.

Research Experience

Students are strongly encouraged to get involved in research by working with faculty members on ongoing research studies throughout their doctoral work. Further, students will gain research experience during their coursework by working on real data. Ideally students should publish one to two papers a year during the doctoral program to develop their research portfolio and to be competitive for academic positions after completion of their doctoral degree.

The Dissertation

SBS uses a three-paper model, where students complete three research papers (of publication quality) on a related topic that demonstrates mastery of content, theory, and methods. In addition, the dissertation will have an introductory chapter that ties the three papers together and a conclusion chapter that summarizes main findings and their research and public health implications. The research papers can involve original data collection, secondary data analysis (using faculty data or national data sets), or some combination of the two.