EPIDEMIOLOGY AND BIOSTATISTICS

Department Website (http://www.sph.sc.edu/epid_bios/default.htm)

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Achieving gains in improving the public's health depends on the ability to identify and solve community health problems. As measurement and research sciences, epidemiology and biostatistics are critical disciplines for the ascertainment and characterization of public health problems. and generating public health action. Combining epidemiology and biostatistics in the same department creates synergies in education and research. However, the two disciplines are unique and thus the Department is comprised of two divisions: the Division of Biostatistics and the Division of Epidemiology.

The Department of Epidemiology and Biostatistics offers the following degrees: Master of Public Health (M.P.H.) (Epidemiology only), Master of Science (M.S.)*, and Doctor of Philosophy (Ph.D.).

Program in Epidemiology

The major in epidemiology is designed for students pursuing careers in the study of patterns of diseases, disabling conditions, and other indicators of health in human populations. The field of epidemiology involves the study of the distribution and determinant of health and disease in human populations, and the application of this knowledge to better prevent and treat disease. Epidemiologists attempt to establish the causes of disease by describing the biological, environmental, social, and behavioral factors affecting illness and premature death, as well as factors that contribute to health and well-being. The evidence generated from epidemiologic research is translated into developing health promotion/disease prevention programs. and formulating health policy. Being an effective epidemiologist requires skills in working in interdisciplinary teams., both in leadership and collaborative roles, whether these teams. are focused on advancing research or public health practice.

Master of Public Health (M.P.H.) in Epidemiology (43 Hours)

Our Master of Public Health (M.P.H.) degree students learn in a multi-faceted educational program; this includes an integrated core curriculum, epidemiologic and biostatistical methods, and experience and training in a public health practice setting.

Master of Science (M.S.) in Epidemiology (43 Hours)

The Master of Science (M.S.) degree is designed for those who wish to acquire skills necessary for doing public health or biomedical research and want to focus on developing research skills for clinical research or the study of determinants of disease and other health-related outcomes. If you intend to further your study by pursuing a Ph.D. in Epidemiology, you will want to choose the M.S. rather than the M.P.H. degree.

Program in Biostatistics

The program in biostatistics is designed for individuals who wish to pursue careers in community health measurement, design and management of health data systems, and the development and application of quantitative methods to health problems. Biostatisticians apply statistical theory, methods, and techniques to the planning, development, and evaluation of health programs and problems. They collect and analyze various types of information; these include demographic and vital statistics, social and business data, health resources statistics, and other forms of social and economic data which are relevant to modern health problems. Biostatisticians design experiments and observational studies, use various computer operating systems and software packages to store and analyze data, develop methods to compare population groups, and prepare inferential and probabilistic statements based on biological, social, and environmental data. Biostatisticians are the theoretical researchers and applied statisticians of public health.

Programs Overview

Doctoral and master's students in programs in the Department of Epidemiology and Biostatistics gain state-of-the-art knowledge and skills that empower them to function effectively and appropriately in identifying, evaluating, and solving public health problems. Upon completion of the program, the students demonstrate:

- knowledge base of the etiology of disease, disability, and other health conditions
- application of epidemiologic and biostatistical methods in identifying the determinants of disease, disability, and other health conditions
- understanding of the design and conduct of research in public health
- skill in data management and analysis and interpretation of research results in studies to describe the distribution of disease, determinants of disease, and clinical trials to advance disease prevention, screening, and treatment.

Departmental faculty are actively involved in research projects funded by the federal government and other sources. Faculty also contribute their expertise to address public health challenges and contribute to health policy at the local, state, national, and global level. Our degree programs. are designed to help students achieve their career goals, whether the goals are an academic research career or a career in public health practice, and whether the preferred setting is in the public sector or in the private sector (such as health systems., pharmaceutical industry, etc.)

Master's Degrees

Epidemiology

The broad objective of the M.P.H. with a major in epidemiology is to prepare an individual to apply epidemiologic skills in a public health setting. The M.S. with a major in epidemiology focuses on the development of basic research skills for the study of correlates and determinants of disease and other health conditions. Students in both M.P.H. and M.S. programs:

- develop an understanding of the integration of epidemiologic research methods into the principles and philosophy of public health
- develop knowledge of the basic epidemiology of commonly studied diseases and other health conditions and health promoting behaviors
- describe the natural history, biology/pathophysiology, risk factors, methods unique to the specific situation, and strategies for disease prevention and control for several diseases or health conditions or health promoting behaviors
- apply descriptive and analytic epidemiologic methods to investigate and identify factors associated with various health conditions
- understand statistical procedures commonly used in public health research and evaluation

- develop expertise in computer applications and usage necessary for successfully managing or conducting epidemiologic studies
- demonstrate ability to manage and summarize health-related data and statistics and to calculate and appropriately interpret associations and their relevance to public health
- develop skills in presenting demographic, statistical, programmatic, and scientific data accurately and effectively for professional and lay audiences.

In addition, the M.P.H. student will develop an understanding of concepts, methods of implementation, and evaluation of health surveillance systems and demonstrate the ability to integrate epidemiologic concepts and analytic approaches to the study of a specific health problem by working with a mentor in a practice setting, preparing a written report, and giving an oral presentation to professionals who will be using the information generated. The M.S. student will demonstrate the ability to synthesize the current state of knowledge of a specific problem, critically evaluate findings, develop appropriate research questions to advance the field, and develop and implement a simple research protocol aimed at testing an epidemiologic hypothesis or estimating an effect of a risk factor on a health outcome and report results in a form suitable for dissemination to the scientific community. Both the M.P.H. and the M.S. require a minimum of 43 hours.

Biostatistics

The broad objective of the M.S. with a major in biostatistics provides the biostatistical concepts, principles, and skills necessary for scientific inquiry into health conditions and related methodologic developments. Students in both programs develop the capacity to:

- demonstrate the ability to evaluate a given health-related problem and to identify the most appropriate statistical technique for analysis
- display mastery of a variety of traditional and newly developed statistical techniques, including multivariable methods for continuous and categorical data analysis
- demonstrate the ability to interpret the results of a statistical analysis and to communicate such interpretations in an easily comprehendible manner
- demonstrate knowledge of academic and non-academic issues and problems in epidemiology and biostatistics
- demonstrate the ability to structure available data in an easily useable form using a variety of data management software tools
- demonstrate the ability to use a variety of statistical software packages, to create and maintain databases, and to analyze data

Students in the M.S. program will demonstrate the ability to work independently in a research problem outside of the classroom setting, and demonstrate the ability to modify and extend existing statistical techniques to answer questions posed by health related situations, and to synthesize such research results into acceptable research papers.

Master of Public Health (M.P.H.) in Epidemiology (43 Hours)

Our Master of Public Health (MPH) degree students learn in a multi-faceted educational program; this includes an integrated core curriculum, epidemiologic and biostatistical methods, and experience and training in a public health practice setting. In Fall 2019, the Arnold School of Public Health will launch our exciting redesigned MPH programs integrated across the public health disciplines. More details are available at here (http://sph.sc.edu/mph/).

Master of Science (M.S.) in Epidemiology (43 Hours)

The Master of Science (M.S.) degree is designed for those who wish to acquire skills necessary for doing public health or biomedical research and want to focus on developing research skills for clinical research or the study of determinants of disease and other health-related outcomes. If you intend to further your study by pursuing a Ph.D. in Epidemiology, you will want to choose the M.S. rather than the M.P.H. degree.

Master of Science (M.S.) in Biostatistics (54 Hours)

The Master of Science (M.S.) degree in Biostatistics prepares students for involvement in biostatistical research, including applying statistical theory to health problems, formulation of designed population and clinical intervention trials, and adapting existing statistical theory to address newly emerging health-related problems.

Doctoral Degrees

The Doctor of Philosophy is an advanced graduate research degree designed for those who intend to pursue teaching and research careers. The major objective of the Ph.D. degree with a concentration in epidemiology is to prepare an individual to pursue original epidemiologic investigation of diseases of unknown etiology and other health conditions or health behaviors and develop novel methodological approaches. The major objective of the Ph.D. program with a concentration in biostatistics is to prepare an individual to develop and apply biostatistical principles and methods to public health problems.

Doctor of Philosophy (Ph.D) in Epidemiology (Minimum of 42 Hours)

The Doctor of Philosophy (Ph.D.) is an advanced graduate degree for those who intend to pursue teaching and research careers. The major objectives are to prepare you to:

1. pursue original epidemiologic research,
2. develop novel methodological approaches,
3. teach epidemiologic methods courses, and
4. consult with non-epidemiologists in a collaborative research setting.

Doctor of Philosophy (Ph.D.) in Biostatistics (54 Hours)

The Doctor of Philosophy (Ph.D.) degree in Biostatistics prepares students for involvement in teaching and independent and collaborative biostatistical research; trains researchers to teach and to pursue original research on analytical approaches to investigating health conditions; and to develop novel biostatistical approaches.

Dual Ph.D. Degree Program in Epidemiology and Environmental Health Sciences

The Department of Epidemiology and Biostatistics and the Department of Environmental Health Sciences jointly offer a dual Doctor of Philosophy (Ph.D.). Students explore the unique set of requirements in relation to study design, bias, measurement of environmental exposures, and measurement of environmental-related health outcomes. The dual Ph.D. requires course work in epidemiology and environmental health sciences selected by the student in consultation with a joint epidemiology/environmental health sciences advisory committee, and successful completion of dissertation research on a topic spanning both disciplines. The successful applicant will have a faculty member in both departments who has agreed to be his/her mentor, and he/she will have a research area of Interest for which we have faculty expertise in both departments. Detailed program requirements for this highly competitive, rigorous dual degree program are available upon request.

Program Requirements for Epidemiology Degree Programs

A graduate student handbook and a list of specific courses needed to meet these requirements are available in the department.

Program Requirements for Biostatistics Degree Programs

A graduate student handbook and a list of specific courses needed to meet these requirements are available in the department.