

Program Director

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The purpose of the PhD program is to prepare students for a career in epidemiologic research in an academic or industry setting. The PhD graduate is expected to have knowledge across a wider range of epidemiologic theories and methods and specific knowledge of the epidemiology of one of the following areas: chronic disease, infectious disease, environmental and occupational health.

Doctoral students are required to pass a written comprehensive examination and to complete a dissertation. For the comprehensive examination the student must demonstrate advanced knowledge of epidemiologic and biostatistical methods. For the dissertation, the student must design and execute an original research study that contributes new knowledge to the field and demonstrates proficiency using advanced analytic methods.

In addition to MS and MPH competencies, doctoral students in epidemiology must demonstrate competencies in the following areas: demonstrate understanding of general and specialized advanced epidemiologic concepts, develop a research protocol, conduct and analyze a research study, and disseminate research findings.

At the completion of the doctoral program in epidemiology students will be able to:

Demonstrate understanding of general and specialized epidemiologic concepts: Demonstrate knowledge of advanced epidemiologic concepts with specialized knowledge in a specific area of epidemiology (e.g., methods, infectious diseases, chronic diseases, environmental, or occupational); apply knowledge of disease pathogenesis to a study protocol; discuss major public health problems; and exhibit knowledge of ethical issues in research.

Develop a research protocol: Synthesize, identify gaps and/or limitations of published research and present appropriate hypotheses to address gaps; develop a research protocol including identification of data sources, evaluate appropriate instruments for data collection, the advantages and disadvantages of different epidemiologic study designs and sources of potential bias.

Conducting and analyzing data from a research study: Demonstrate proficiency in data collection, data cleaning, primary or secondary data analysis, summarizing statistical analyses and results, and evaluating potential for bias.

Dissemination of research findings: Provide a structured proposal of a research study including the background, study hypotheses, design, methodology, and contribution to the field; communicate dissertation results to lay and scientific communities through presentations at conferences and publications in the peer-reviewed literature.

Admissions Requirements

Applicants must hold an undergraduate degree from an accredited institution of higher learning. Applicants should have academic backgrounds of excellence, usually with majors, or equivalent, in the fields in which they intend to study for advanced degrees. Normally, a B average (or equivalent) from an accredited college is required. With evidence of special promise, such as high Graduate Record Examination scores, an applicant whose academic record falls short of a B average may be accepted on a conditional basis. Meeting the minimum requirements does not assure acceptance. The departments may, and often do, set higher admission standards. Moreover, the number of spaces available for new graduate students limits the number who can be accepted. Students who apply in their senior year must provide evidence of the completion of their

* Students matriculating Fall 2009 or later may choose either curriculum Plan A or curriculum Plan B for the PhD in Epidemiology.

baccalaureate work before registration in Columbian College is permitted. Applicants should be aware that graduate courses taken prior to admission while in non-degree status are not used in assessing admissibility to degree programs and may not be transferable into those programs. The Program-at-a-Glance presents the Ph.D. curriculum for students admitted to the Ph.D. program with no intermediate Master's degree.

If desired, a student may complete the M.S. or M.P.H. program prior to admission to the Ph.D. degree program, in which case no more than 24 credit hours from the M.S. degree may be applied to the Ph.D. course work requirements. In this instance the student will be required to take a minimum of 27 additional credit hours of coursework. The distribution of these courses between epidemiology and statistics will depend on the nature of the Master's degree and whether the transferred credit hours would be used to defray epidemiology or statistics course work. Full information about the Graduate Admissions Application and policies are available online at <http://www.gwu.edu/apply/graduateprofessional>. For reporting GRE general test scores use the following institutional code: 5246.

Minimum Prerequisite Courses for Admission Consideration (or equivalents to these GW courses)

The courses listed below (or equivalents) are prerequisites for admission consideration, and **MUST** appear on your transcript. Submit your PhD Epidemiology program admission application only after you have completed all of the following courses:

BISC	011	Introductory Biology: Cells and Molecules	4	Lecture (3 hours), laboratory (1 credit/3 hours). Nutrition and metabolism, cellular and developmental biology, genetics, and molecular biology of plants and animals.
BISC	012	Introductory Biology: Biology of Organisms	4	Lecture (3 hours), laboratory (1 credit/3 hours). Concepts and methods in the study of whole organisms. Evolutionary theory; population biology; diversity of plants, animals, fungi, and microorganisms; ecology and behavior; and animal structure and function.
MATH	031	Single-Variable Calculus I	3	Limits and continuity. Differentiation and integration of algebraic and trigonometric functions with applications.
MATH	032	Single-Variable Calculus II	3	The calculus of exponential and logarithmic functions. L'Hopital's rule. Techniques of integration. Infinite series and Taylor series. Polar coordinates. Prerequisite: Math 31
MATH	033	Single-Variable Calculus III	3	Partial derivatives and multiple integrals. Vector-valued functions. Topics in vector calculus, including line and surface integrals and the theorems of Gauss, Green, and Stokes. Prerequisite: MATH 32

Additional Course Requirements

The courses listed below are "Additional Course Requirements." Applicants lacking these courses (or equivalents to these GW courses) will be considered for admission, but, if admissible, will be admitted conditionally with the expectation that these courses will be satisfactorily completed within two semesters following matriculation in the program. These credits do not count as credit toward the 72 credit graduation requirement, nor are grades earned in these additional courses reflected in the overall grade point average.

MATH	84	Linear Algebra I	3	Linear equations, matrices, inverses, and determinants. Vector spaces, rank, eigenvalues, and diagonalization. Applications to geometry and ordinary differential equations. Prerequisite: MATH 031
PubH	249	Use of Statistical Packages: Data Management and Data Analysis	3 or	This course familiarizes the student with one of the most widely used database management systems and statistical analysis software packages, the SAS System, operating in a Windows environment. Throughout the course, several database management system techniques and data analytical strategies for the appropriate analysis of datasets obtained from a variety of studies will be presented. Statistical techniques covered include linear regression, analysis of variance, logistic regression, and survival analysis.
or	or			
STAT	183	Intermediate Statistical Laboratory: Statistical Computing Packages	3	Application of program packages (e.g., SAS, SPSS) to the solution of one-, two- and k-sample parametric and nonparametric statistical problems. Basic concepts in data preparation, modification, analysis and interpretation of results. Prerequisite: an introductory statistics course.

Ph.D. Epidemiology Degree Requirements

Course Distribution Summary	Credits
Core Courses <ul style="list-style-type: none"> • Public Health (15 Credits) • Statistics (15 Credits) 	30
Approved Elective Courses <ul style="list-style-type: none"> • Public Health • Statistics 	18 (minimum)
Consulting Note: May be waived by the Epidemiology Program Director, based on written documentation of prior equivalent course work or relevant work experience. Waiving part or all of this requirement does not alter the 72 total credit requirement. Waiver of the consulting course increases the total number of electives by the number of consulting credits waived.	3
Dissertation Research	12-21
Total Credits	72
The General Examinations	
<p>Part I is a <u>written comprehensive examination</u> consisting of one examination in the field of biostatistics and one in the field of epidemiology. The epidemiology examination is based on the course content of PubH 247 Design of Health Studies, and the biostatistics examination is based on the course content of PubH 466 Biostatistical Methods and is administered by the faculty of the Department of Statistics. Students are expected to take the comprehensive examination within 24 months from the date of enrollment in the program. In addition, students are required to make up any deficiencies prior to taking the examination, e.g., by enrolling in appropriate master's-level courses as needed. A student who fails to pass the comprehensive examination may, with the approval of the faculty, repeat the examination the following year. Failure on the second attempt will result in termination from the Ph.D. program.</p>	
<p>Part II, the research proposal, consists of an <u>oral examination</u> based on a written dissertation research proposal. As soon as feasible after successful completion of the comprehensive exam, students are encouraged to identify a dissertation advisor and a topic of research. The written dissertation proposal is then submitted to the student's Dissertation Research Committee, and the student will make an oral presentation of his or her proposal to the Committee. The Committee will determine the student's readiness to pursue and successfully complete the proposed research, in addition to the appropriateness of the specific problem for dissertation level research.</p>	
<p>Upon successful completion of the required course work and both parts of the General Examination, the candidate will generally be recommended to the Associate Dean for Graduate Affairs of The Columbian College of Arts and Sciences (CCAS) for promotion to PhD Candidacy: the dissertation research. A candidate must file an approved dissertation research plan with the CCAS before being admitted to PhD Candidacy. Prior to completion of the General Examination, a student may register for at most 6 credit hours of Dissertation Research (EPID 399).</p>	
<p>The document <u>Doctoral Dissertation Reference Guide</u> describes the specific requirements for the doctoral dissertation established by the <i>Program Management Committee</i>.</p>	
Professional Enhancement Requirement (Two Days)	
<p>Professional enhancement activities supplement the academic curriculum and help prepare students to participate actively in the professional community. They enhance practical knowledge and awareness of public health issues – either in general or in a student's specific area of study.</p>	
<p>Students can fulfill this requirement by attending workshops, seminars, or other relevant professional meetings, which are often held at SPHHS and in the metropolitan Washington, DC area. Examples of conference sponsors include the National Academy for State Health Policy, the Pan American Health Organization, the American Public Health Association, the American College of Healthcare Executives, the Area Health Education Center, the American College of Sports Medicine, and the National Athletic Trainer's Association. Opportunities for professional enhancement are regularly publicized via the SPHHS Listserv and through your department or advisor. It is hoped that PhD students will fulfill one day of this two day requirement by participating in a poster presentation at GWUMC Research Day.</p>	
<p><i>Students must submit documentation of Professional Enhancement activities to the Epidemiology Program Director, which includes a <u>prior</u> approval, a description of the program agenda, and proof of attendance before applying for graduation.</i></p>	

THE GEORGE WASHINGTON UNIVERSITY MEDICAL CENTER WASHINGTON DC	Columbian College of Arts and Sciences School of Public Health and Health Services PhD Epidemiology (Plan A) Program-at-a-Glance 2009-2010			
Required Core Courses (30 Total Credits)				
Required Public Health Core Courses (15 Credits)		Credits	Semester Offered	Grade
PubH 201	Biological Concepts for Public Health	2	Summer 1, Fall, Spring	
PubH 203	Principles and Practice of Epidemiology	3	Fall, Spring, Summer 10 week	
PubH 247	Design of Health Studies <i>Basis for PhD General Comprehensive</i>	3	Fall, Spring	
PubH 403	Measurement in Public Health and Health Services	3	Spring	
PubH 209	Topics	2	Summer, Fall, Spring	
PubH 204	One of the following: Environmental & Occupational Health in a Sustainable World	2	Summer 1, Fall, Spring	
PubH 205	Policy Approaches to Public Health	2	Sum 10 wk, Fall, Spr	
PubH 207	Social & Behavioral Approaches to Public Health	2	Summer 1, Fall, Spring	
Required Statistics Core Courses (15 Credits)		Credits	Semester Offered	Grade
STAT 201	Mathematical Statistics I	3	Fall	
STAT 202	Mathematical Statistics II	3	Spring	
STAT 210	Data Analysis	3	Spring	
PubH 465	Design of Medical Studies	3	Spring	
PubH 466	Biostatistical Methods <i>Basis for PhD General Comprehensive</i>	3	Fall	
Approved Elective Courses (18 Credits Minimum)				
Approved Public Health Elective Courses		Credits	Semester Offered	Grade
* May be taken for 3 credits by adding PubH 209 Topics by the same name for 1 credit.				
PubH 209	Topics in Epidemiology and Biostatistics	1-2	Summer, Fall, Spring	
PubH 223	Toxicology: Applications for Public Health Policy	3	Fall	
PubH 224	Problem Solving in Environ & Occupational Hlth	3	Summer 10 week	
PubH 242*	Clinical Epidemiology and Decision Analysis	2	Spring	
PubH 244*	Cancer Epidemiology	2	Spring	
PubH 245*	Infectious Disease Epidemiology	2	Spring	
PubH 246*	Injury Epidemiology and Prevention	2	Fall	
PubH 248*	Epidemiologic Methods in Older Populations	2	Fall	
PubH 250*	Epidemiology of HIV/AIDS	2	Fall	
PubH 259*	Epidemiologic Surveillance in Public Health	2	Spring	
PubH 321	Global Health Frameworks	3	Fall	
Approved Statistics Elective Courses		Credits	Semester Offered	Grade
STAT 227	Survival Analysis	3	Fall	
STAT 231	Categorical Data Analysis	3	Fall Alternate Years	
STAT 207	Methods of Statistical Computing I	3		
STAT 208	Methods of Statistical Computing II	3		
STAT 213	Intermediate Probability and Stochastic Processes	3	Spring, alternate years	
STAT 215	Applied Multivariate Analysis I	3	Alternate academic yrs	
STAT 216	Applied Multivariate Analysis II	3	Alternate academic yrs	
STAT 217	Design of Experiments	3	Fall, alternate years	
STAT 218	Linear Models	3	Spring, alternate years	
STAT 223	Bayesian Statistics (Theory and Applications)	3	Spring, alternate years	

STAT 226	Advanced Biostatistical Methods	3	Spring	
STAT 262	Nonparametric Inference	3		
STAT 263	Advanced Statistical Theory I	3	Fall	
STAT 265	Multivariate Analysis	3	Fall, alternate years	
STAT 273	Stochastic Processes I	3	Alternate academic years	
STAT 274	Stochastic Processes II	3	Alternate academic years	
Consulting (3 Credits)				
Note: May be waived by the Epidemiology Program Director, based on written documentation of prior equivalent course work or relevant work experience. Waiver of the consulting course increases the total number of electives by the number of consulting credits waived.				
PubH 209.58	Consulting Practicum	2	Summer, Fall, Spring	
PubH 258	Advanced Topics in Biostatistical Consulting	1	Spring	
Dissertation Research (12-21 Credits)				
EPID 399	Dissertation Research for PhD Epidemiology Students	Taken in units of 3 credits	Summer, Fall, Spring	