EPIDEMIOLOGY, DOCTOR OF PHILOSOPHY (PH.D.)

Program mission

The mission of the Ph.D. program in epidemiology is to train students to become independent research scientists and leaders who can develop epidemiological methods and conduct outstanding population-based research.

Program goals

1. Critical foundation skills: The program is designed to provide students with the critical skills required to advance to positions as epidemiological researchers/trainers in a broad spectrum of positions.
2. Mastery and application of science: The structure of the program provides a framework for the progressive development of a mastery of the current state of the subject matter of epidemiology and ability to synthesize this information and apply this foundation to the identification of key areas of investigation/experimentation in bioscience.
3. Communication: Students will develop skills in the various means of communicating both the core of epidemiological knowledge and the expression of epidemiological methodology, research design, results and interpretation to a variety of potential audiences.

Student learning outcomes

Students in the doctoral program in epidemiology will develop competencies in the following areas, as described below.

1. Integrated knowledge of epidemiology: Students will demonstrate an appropriate level of knowledge of theories of disease causation as well as bias in epidemiologic research and demonstrate in-depth understanding of one or more substantive theories related to research. Students will be able to appropriately link theoretical frameworks to the design, conduct and interpretation of epidemiologic research and demonstrate familiarity with the research literature and the ability to evaluate and critique publications appropriate to an independent research scientist.
2. Problem-solving skills: Students will be able to appropriately apply epidemiologic and statistical methods for research needs, demonstrating proficiency in selecting the appropriate measures of association for the research at hand and correctly implementing analytic techniques, including addressing issues such as confounding and effect modification. Students will be able to evaluate and interpret results, explaining relationships between determinant(s) and outcome(s) under study.
3. Research design: Students will construct and develop novel epidemiologic research questions, demonstrating proficiency in selecting the most appropriate study designs such that bias is minimized and efficiency maximized. Students will understand the required elements to estimate sample size, know how to identify and minimize bias and confounders through study design and analysis, and demonstrate knowledge of the impact of measurement issues on study validity.
4. Written communication skills: Students will demonstrate proficiency in scientific writing, including manuscript development, grant writing and writing for multiple audiences, including lay audiences and policy-makers. Students will demonstrate an appropriate level of written communication skill with respect to grammar, syntax, spelling and use of vocabulary to effectively present information, including the use of figures, tables and citations.
5. Oral communication skills: Students will demonstrate effective oral communication skills across disciplines, framing questions appropriately and implementing active listening skills in delivering oral presentations to professional audiences, lecturing to students or leading discussions. Students will appropriately use audio/visual technologies to develop effective presentations with respect to content, organization and appropriate use of language.

VCU Graduate Bulletin, VCU Graduate School and general academic policies and regulations for all graduate students in all graduate programs

The VCU Graduate Bulletin website documents the official admission and academic rules and regulations that govern graduate education for all graduate programs at the university. These policies are established by the graduate faculty of the university through their elected representatives to the University Graduate Council.

It is the responsibility of all graduate students, both on- and off-campus, to be familiar with the VCU Graduate Bulletin as well as the Graduate School website (http://www.graduate.vcu.edu/) and academic regulations in individual school and department publications and on program websites. However, in all cases, the official policies and procedures of the University Graduate Council, as published on the VCU Graduate Bulletin and Graduate School websites, take precedence over individual program policies and guidelines.

Visit the academic regulations section for additional information on academic regulations for graduate students. **(**http://bulletin.vcu.edu/academic-regs/**)**

Degree candidacy requirements

A graduate student admitted to a program or concentration requiring a final research project, work of art, thesis or dissertation, must qualify for continuing master's or doctoral status according to the degree candidacy requirements of the student's graduate program. Admission to degree candidacy, if applicable, is a formal statement by the graduate student's faculty regarding the student's academic achievements and the student's readiness to proceed to the final research phase of the degree program.

Graduate students and program directors should refer to the following degree candidacy policy as published in the VCU Graduate Bulletin for complete information and instructions.

Visit the academic regulations section for additional information on degree candidacy requirements. **(**http://bulletin.vcu.edu/academic-regs/grad/candidacy/**)**

Graduation requirements

As graduate students approach the end of their academic programs and the final semester of matriculation, they must make formal application to graduate. No degrees will be conferred until the application to graduate has been finalized.

Graduate students and program directors should refer to the following graduation requirements as published in the Graduate Bulletin for a complete list of instructions and a graduation checklist.

Visit the academic regulations section for additional information on graduation requirements. **(**http://bulletin.vcu.edu/academic-regs/grad/graduation-info/**)**

Other information

School of Medicine graduate program policies

The School of Medicine provides policies applicable to all programs administratively housed in the school. Information on **doctoral programs** is available elsewhere in this chapter of the Graduate Bulletin.

Apply online at sophas.org (http://www.sophas.org/)**.**

Admission requirements

Degree:	Semester(s) of entry:	Deadline dates:	Test requirements:
Ph.D.	Fall	Feb 1 (application strongly encouraged by this date)	GRE, TOEFL/ IELTS

Special requirements

- Applicants must hold a master's degree, preferably in the health or social sciences, including, but not limited to, public health, and provide test scores as detailed below. Applicants must provide all required materials as described herein and in the VCU Admissions graduate application checklist.

In addition to the general admission requirements of the VCU Graduate School (http://bulletin.vcu.edu/graduate/study/admission-graduate-study/admission-requirements/), applicants must meet the following minimum qualifications.

1. Prior degree: Master's degree in the health or social sciences, including, but not limited to, public health (M.P.H.), with a minimum GPA of 3.0
2. GRE: Current GRE test results (taken within the past five years) with scores at or above the 75th percentile preferred in all components of the exam (e.g., minimum scores of 159 quantitative, 157 verbal and 4.5 analytical writing)
3. TOEFL: For non-native speakers of English, recommended minimum scores of either 100iBT, 600 PBT or IELTS scores of 6.5 (academic band score)
4. Personal statement: Applicants must include a personal statement that indicates: (1) their reasons for pursuing a doctoral degree in epidemiology, (2) their particular areas of research focus or study, (3) the departmental faculty advisers with whom the students would prefer to work and (4) career goals upon graduation.
5. Reference letters: Students must submit three letters of recommendation from three individuals who can assess the applicant's qualifications for graduate school. Letters from past professors or faculty advisers are most appropriate.
6. Current CV or resume: Students must submit a current CV or resume.

Degree requirements

In addition to the general VCU Graduate School graduation requirements (http://bulletin.vcu.edu/academic-regs/grad/graduation-info/), students will be required to complete a minimum of 61 graduate credit hours as follows:

1. Four core courses focusing on epidemiological methods (12 credit hours)
2. Two core courses focusing on biostatistical theory and methods (six credit hours)
3. Four semesters of journal club (four credit hours)
4. Three courses of methodological electives (nine credit hours)
5. Three courses of substantive area electives, with at least one relating to the biological processes associated with the student's chosen substantive area (nine credit hours)
6. A minimum of two credit hours of practical research skills development
7. At least one course in the responsible conduct of research (one credit hour)
8. At least 18 credit hours of directed dissertation research

Students will also be required to complete the following:

Practical experience

1. Assistantship: All doctoral students are required to work an average of 20 hours per week under the direction of their adviser as part of experiential program training. This 20-hour-per-week requirement is met by work in a research assistantship and at least one semester of a teaching assistantship.
   a. Research assistantship: Research program support exposes students to a variety of aspects of developing and implementing research plans and programs. Work includes drafting manuscripts or preparing presentations for refereed conferences, conducting research activities in the community, traveling to attend research team meetings, or regular work with research team members.
   b. Teaching assistantship: All doctoral students are required to serve as teaching assistants for at least one semester before graduation. The student and her/his adviser discuss and select the course that is best-suited for the teaching assistantship. During the semester(s) when students engage in the teaching assistantship, teaching hours count toward the experiential training requirement and are combined with research hours to meet the expected 20-hour-per-week training time.
2. Seminar attendance: All students are expected to attend all doctoral level Division of Epidemiology seminars during their tenure in the program. These seminars are generally held every other week during fall and spring semesters. In addition, students must attend any special public health seminars offered collaboratively by the public health departments. These special seminars may occur one to two times each semester.
3. Grant application submission: All students are expected to submit at least one grant application related to their dissertation to a federal agency or nongovernmental organization (according to student eligibility) to gain grantsmanship experience. The adviser guides the student on the timing for submission of this grant application and the appropriate funding organization or agency.

Comprehensive examinations

Comprehensive examinations include a written examination and an oral candidacy examination. The written examination assesses knowledge of completed didactic course work on core epidemiological and biostatistical methods as well as a tailored substantive section

based on the student's research focus. The oral candidacy examination is based upon the student's dissertation proposal, which consists of three proposed research projects.

Written comprehensive examination
Students are expected to take the written comprehensive examination after completing all didactic program courses (typically the program core, *a* practical research skills course, a responsible conduct of research course and 18 credits of elective course work). Program expectation for satisfactory academic progress is that students complete the written comprehensive examination by the end of the second academic year (i.e., no later than the end of the second summer semester). Exceptions beyond this time limit must be approved by the student's adviser and the graduate program director based on the student's submission of a written explanation for the delay in progress. This written explanation must include a plan of action and schedule for completing the written comprehensive examination by the date approved by the student's faculty adviser.

Oral candidacy examination
After passing the written comprehensive examinations, the student is eligible for the oral candidacy examination. For this examination, the student prepares background and methods for three proposed research projects in a focused area of dissertation research.

To maintain satisfactory academic progress in the program, students should complete the oral candidacy examination by the end of third fall semester. Exceptions beyond this time limit must be approved by the student's committee and the graduate program director based on the student's submission of a written explanation for the delay in progress. This written explanation must include a plan of action and schedule for completing the oral candidacy examination by the date approved by the student's dissertation adviser.

Upon successful completion of the oral candidacy examination, the student will embark upon the dissertation research.

Dissertation

1. The dissertation must be a hypothesis-based, analytical epidemiology project designed by the student under the supervision of the faculty adviser and dissertation advisory committee members as appropriate. The dissertation consists of a minimum of three papers prepared in manuscript style and suitable for submission to a peer-reviewed journal.
2. The student submits at least one of the three manuscripts from the dissertation to a peer-reviewed journal before the student schedules the final defense.

To maintain satisfactory academic progress in the program, students should schedule the dissertation examination by the second semester of the fourth year. Exceptions beyond this time limit must be approved by the student's committee and the graduate program director based on the student's submission of a written explanation for the delay in progress. Plans for completion of the dissertation examination will be considered on an individual basis. Failure to maintain satisfactory academic progress may result in a grade of U (unsatisfactory) for the dissertation work.

Satisfactory academic progress
Satisfactory academic progress may be assessed on multiple factors, including progress on dissertation development in accordance with timelines established between the student and adviser and/or committee; lack of professional conduct, including communication lapses or failure to communicate with the adviser and/or committee about delays in progress and/or absence from research work; honor policy violations or academic misconduct; and failure to maintain continuous enrollment without an approved leave of absence.

Course requirements

Course	Title	Hours
Required core courses		
BIOS 602	Analysis of Biomedical Data II	3
EPID 649	Analysis of Health Datasets	3
EPID 650	Epidemiologic Methods for Research	3
EPID 651	Intermediate Epidemiologic Methods for Research	3
EPID 652	Advanced Epidemiologic Methods and Data Analysis	3
EPID 690	Journal Club (taken four semesters)	4
STAT 643	Applied Linear Regression	3
Required additional courses		
Practical research skills development: Select a minimum of two credits from the following.		2
ALHP 716	Grant Writing and Project Management in Health Related Sciences	
BIOS 610	Research Processes and Methods for the Health Professions	
GRAD 601	The Academic Profession	
GRAD 602	Teaching and Learning in Higher Education	
GRAD 604	Teaching, Learning, Technology and the Future of Higher Education	
GRTY 608	Grant Writing	
Responsible research conduct: Select at least one of the following.		1
OVPR 601	Scientific Integrity	
OVPR 602	Responsible Scientific Conduct	
OVPR 603	Responsible Conduct of Research	
Elective courses		
Methodological electives: Select nine credits from the following.		9
BIOS 549	Spatial Data Analysis	
BIOS 567	Statistical Methods for High-throughput Genomics Data I	
BIOS 632	Multivariate Analysis	
BIOS 635	Structural Equation Modeling	
BIOS 668	Statistical Methods for High-throughput Genomic Data II	
BIOS 671	Nonlinear Models	
BNFO 601	Integrated Bioinformatics	
CCTR 630	Design Implications in Clinical Trials	
CCTR 631	Adaptive Clinical Trials	
CCTR 692	Special Topics in Translational Research	
EPID 620	Cancer Epidemiology	
EPID 622	Maternal and Child Health	

EPID 623	Injury and Violence Epidemiology	
EPID 646	Epidemiology of Psychiatric and Substance Use Disorders	
EPID 648	Behavioral Epidemiology	
EPID 692	Independent Study	
HADM 763	Applied Health Services Research	
HCPR 730	Survey Research Methods and Analysis for Health Policy	
HGEN 603	Mathematical and Statistical Genetics	
HGEN 617	Genetic Analysis of Complex Traits	
HGEN 619	Quantitative Genetics	
PHAR 688	Applied Pharmacoepidemiology Research Methods	
PPAD 723	Survey Research Methods	
PSYC 655	Community Interventions: Development, Implementation and Evaluation	
SBHD 610	Behavioral Measurement	
SBHD 631	Disseminating, Adopting and Adapting Evidence-based Prevention Programs	
SBHD 633	Structural Equation Modeling	
SBHD 636	Community-based Participatory Research	
SBHD 637	Program Evaluation	
SBHD 638	Applications in Qualitative Research Methods	
SOCY 656	Social Network Analysis	
URSP 621	Introduction to Geographic Information Systems	
URSP 622	Community Socioeconomic Analysis Using GIS	
URSP 625	Spatial Database Management and GIS Modeling	
URSP 627	GIS Applications in Urban Design	
Substantive area electives: Select three courses of substantive area electives, at least one relating to the biological processes associated with the student's chosen substantive area from the following.		9
EPID 603	Public Health Policy and Politics	
EPID 620	Cancer Epidemiology	
EPID 622	Maternal and Child Health	
EPID 623	Injury and Violence Epidemiology	
EPID 645	Public Health Genomics	
EPID 646	Epidemiology of Psychiatric and Substance Use Disorders	
EPID 648	Behavioral Epidemiology	
EPID 691	Special Topics	
EPID 692	Independent Study	
GRTY 601	Biological and Physiological Aging	
GRTY/PSYC 602	Psychology of Aging	
GRTY 603	Social Gerontology	
GRTY 604	Problems, Issues and Trends in Gerontology	
GRTY 606	Aging and Human Values	
GSWS 620	Theorizing Sexuality	
HADM 602	Health System Organization, Financing and Performance	
HADM 611	Health Care Law and Bioethics	
HADM 615	Health Care Politics and Policy	
HADM 624	Health Economics	
HADM 704	Foundations of Health Service Organization Theory	
HADM 705	Advanced Health Service Organization Theory	
HCPR 610	Foundations in Health Services Research Methods	
HCPR 701	Health Services Research and Policy I	
HCPR 702	Health Services Research and Policy II	
HCPR 720	Economics of Health Disparities	
HGEN 501	Introduction to Human Genetics	
HGEN 502	Advanced Human Genetics	
HGEN 610	Current Literature in Human Genetics	
HGEN 620	Principles of Human Behavioral Genetics	
HSEP 603	Risk Assessment	
HSEP 650	Public Health Preparedness	
NURS 502	Advanced Pharmacology	
PSYC 629	Biological Basis of Behavior	
PSYC 630	Social Psychology	
PSYC 660	Health Psychology	
PSYC 679	Culture, Ethnicity and Health	
SBHD 611	Health Literacy	
SBHD 630	Theoretical Foundations of Social and Behavioral Health	
SBHD 631	Disseminating, Adopting and Adapting Evidence-based Prevention Programs	
SBHD 632	Health Disparities and Social Justice	
SBHD 634	Patient-Provider Interaction	
SBHD 637	Program Evaluation	
SLWK 746	Social Work Practice and Psychopharmacology	
SLWK 761	Interpersonal Violence in Clinical Social Work Practice	
Dissertation research		
EPID 697	Directed Research in Epidemiology	18
Total Hours		61

The minimum total of graduate credit hours required for this degree is 61.

Typical plan of study

Many students often end up taking more than the minimum number of hours required for a degree program. The total number of hours may vary depending upon the program, nature of research being conducted by a study or in the enrollment or funding status of the student. A typical plan of study is available on the department's website (https://familymedicine.vcu.edu/epidemiology/phd/).

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Program website: familymedicine.vcu.edu/epidemiology/epidemiology-graduate-programs/phd-in-epidemiology-program (https://familymedicine.vcu.edu/epidemiology/epidemiology-graduate-programs/phd-in-epidemiology-program/)