The mission of the Ph.D. program in epidemiology is to educate and train students to become independent, competent and self-directed research scientists so they can conduct outstanding clinical and population-based research. Students will learn methods for studying disease etiology and prevention in populations and evaluating interventions, diagnostic tests and treatment efficacy; they will implement such methods in an independent research study under the mentorship of an experienced epidemiology researcher.

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 Graduate study section for additional information on academic regulations for graduate students. (http://bulletin.vcu.edu/graduate/study/general-academic-regulations-graduate-students)

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 Graduate study section for additional information on degree candidacy requirements. (http://bulletin.vcu.edu/graduate/study/general-academic-regulations-graduate-students/degree-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 Graduate study section for additional information on graduation requirements. (http://bulletin.vcu.edu/graduate/study/general-academic-regulations-graduate-students/graduation-requirements)

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

<table>
<thead>
<tr>
<th>Degree:</th>
<th>Semester(s) of entry:</th>
<th>Deadline dates:</th>
<th>Test requirements:</th>
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<tbody>
<tr>
<td>Ph.D.</td>
<td>Fall</td>
<td>Application strongly encouraged by Jan 15</td>
<td>GRE, TOEFL</td>
</tr>
</tbody>
</table>

Special requirements

- Applicants must hold a master’s degree, preferably in public health or a related field, 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 public health (M.P.H.) or equivalent M.S. degree, (e.g., sociology, biology, mathematics) 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 their reasons for pursuing a doctoral degree in epidemiology, their particular areas of research focus or study, the departmental faculty advisers with whom the students would prefer to work, and 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/graduate/study/general-academic-regulations-graduate-students/graduation-requirements), students will be required to complete a minimum of 61 graduate credit hours as follows:

1. Three core courses focusing on epidemiological methods (nine 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. Four courses of methodological electives, including EPID 649 (12 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. Teaching experience: All doctoral students are required to serve as a teaching assistant for at least one semester before graduation. The student and her/his adviser discuss which course would be best-suited for the teaching assistantship.
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 required to submit at least one grant application related to their dissertation to a federal or nongovernmental funder to gain grantsmanship experience.

Comprehensive exams

Comprehensive exams include a written examination that assesses knowledge of completed didactic course work on core epidemiologic and biostatistical methods as well as a tailored substantive section based on the student’s research focus and an oral comprehensive exam based upon the student’s dissertation proposal.

Dissertation

1. The dissertation must be a hypothesis-based, analytical epidemiology project designed by the student under the supervision of the faculty adviser and advisory committee members as appropriate.
2. Students develop and submit three manuscripts from the dissertation to peer-reviewed journals. Students should have submitted at least one manuscript before their final defense.

Curriculum requirements

Core courses

Core courses
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
STAT 744 Regression II 3

Methodological electives
EPID 649 Analysis of Health Datasets 3

Select nine credits from the following:

BIOS 567 Statistical Methods for High-throughput Genomics Data I
BIOS 631 Mixed Models and Longitudinal Data Analysis
BIOS 632 Multivariate Analysis
BIOS 647 Survival Analysis
BIOS 668 Statistical Methods for High-throughput Genomic Data II
BIOS 671 Nonlinear Models
BIOS 691 Special Topics in Biostatistics
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 646 Epidemiology of Psychiatric and Substance Use Disorders
EPID 648 Behavioral Epidemiology
EPID 691 Special Topics
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:

EPID 603 Public Health Policy and Politics
EPID 620 Cancer Epidemiology
EPID 622 Maternal and Child Health
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
HCPR 610 Foundations in Health Services Research Methods
HCPR 701 Health Services Research and Policy I
HCPR 702 Health Services Research and Policy II
HADM 704 Foundations of Health Service Organization Theory
HADM 705 Advanced Health Service Organization Theory
HCPR 720 Economics of Health Disparities
HGEN 501 Introduction to Human Genetics
HGEN 502 Advanced Human Genetics
HGEN 610 Current Literature in Human Molecular Genetics
HGEN 620 Principles of Human Behavioral Genetics
HSEP 603 Risk Assessment
HSEP 650 Public Health Preparedness
NURS 502 Advanced Nursing Practice: Pharmacotherapeutics
PSYC 629 Biological Basis of Behavior
PSYC 630 Social Psychology
PSYC 660 Health Psychology
### 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
- EPID 691 Special Topics
- GRAD 601 The Academic Profession
- 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

### Dissertation
Take a minimum of 18 credits in the following: 18
- EPIP 697 Directed Research in Epidemiology

**Total graduate credit hours required (minimum) 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. Students should refer to their program websites and talk with their graduate program directors or advisers for information about typical plans of study and registration requirements.

**Graduate program director**
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**Program website**: familymedicine.vcu.edu/epidemiology/phd (http://www.familymedicine.vcu.edu/epidemiology/phd)