

EPIDEMIOLOGY, DOCTOR OF PHILOSOPHY (PH.D.)

Program mission

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 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	Application strongly encouraged by Jan 15	GRE, TOEFL

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/academic-regs/grad/graduation-info>), 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

Course	Title	Hours
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:		9

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: 9

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
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

(804) 628-2512

Program website: familymedicine.vcu.edu/epidemiology/phd (<http://www.familymedicine.vcu.edu/epidemiology/phd>)

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

EPID 697	Directed Research in Epidemiology
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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. A typical plan of study is available on the department's website (<https://familymedicine.vcu.edu/epidemiology/phd>).

Graduate program director

Juan Lu, Ph.D., M.P.H., M.D.

Associate professor, Division of Epidemiology, Department of Family
Medicine and Population Healthjuan.lu@vcuhealth.org

(804) 828-9786

Additional contact

Lisa Anderson

Director of educational programs, Division of Epidemiology, Department
of Family Medicine and Population Healthlisa.s.anderson@vcuhealth.org