

**Doctor of Philosophy in Public Health Sciences
Concentration in Epidemiology**

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Introduction

The concentration in epidemiology in the Ph.D. program in public health sciences is designed to develop academic researchers in population-based epidemiology.

Competencies

To graduate, students in the Ph.D. concentration in epidemiology must demonstrate the following competencies *in addition to those for the MS degree*:

- In depth knowledge of the history and philosophy of epidemiology
- Mastery of experimental and observational study designs and the ability to identify optimal designs for specific hypotheses
- Ability to develop and apply:
 - Questionnaires
 - Biomarkers for health status, exposure and susceptibility
- Mastery of multivariable analytic methods for evaluating risk and prognosis
- Ability to critically evaluate the published epidemiologic research
- Expertise in one or more epidemiologic specialty such as nutritional, molecular, clinical, genetic, cancer, or chronic disease epidemiology
- Practical knowledge of issues in research management including:
 - Formation and leadership of multidisciplinary teams
 - Staffing, budgeting, tracking
 - Subject recruitment and retention
 - Data quality control and data safety management
 - Funding mechanisms and grantsmanship
 - Research ethics and regulations
- Professional quality peer-review, oral and poster presentation, report, grant, and manuscript writing
- Mentoring of junior peers
- Development, conduct, completion and defense of a dissertation on an original research project

Competencies are demonstrated by passage of the proficiency and candidacy examinations, by successful mentoring of master's students or doctoral students not yet in candidacy, and by successful completion and defense of the dissertation.

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Admission

Students who have satisfactorily completed the M.S. degree in epidemiology are eligible for the Ph.D. concentration in epidemiology. Students with a master's degree in a related discipline or an advanced degree (for example, M.D., Ph.D., D.O.) may be accepted also pending evaluation of appropriate training, experience, and coursework. Previous coursework in mathematics and/or statistics and biological or health sciences (for example, biology, biochemistry, anatomy, physiology, microbiology) is strongly recommended. Students completing the M.Sc. in clinical investigation sciences or MPH with an epidemiology concentration may be required to complete additional coursework to be accepted into the epidemiology Ph.D. concentration.

Curriculum

Faculty Advisor

Upon admission to the concentration, each student is assigned a faculty advisor who works with the student to develop a program of study.

Program of Study

The program of study recognizes core elements of modern epidemiology as well as its breadth and multidisciplinary nature. This requires the selection of a minor field of concentration, such as biostatistics, environmental science, molecular genetics, behavioral science, health management and systems sciences, clinical research, or another relevant area of study, and the completion of at least 6 credit-hours of coursework in this field.

Degree Requirements

The emphasis in doctoral training goes beyond accumulating course credit. The coursework is organized into two blocks of 24 credit-hours each. Completion of the first block of coursework is prerequisite for sitting for the proficiency examination. After passing the proficiency examination, the student can proceed with the second block of coursework. Successful completion of the second block is prerequisite to sitting for the candidacy examination. After passing the candidacy examination, the student is admitted to doctoral candidacy. A doctoral candidate must then successfully develop and defend a dissertation proposal that describes an original and independent research project. Upon successful defense of the proposal, the student may then proceed to dissertation research. Upon successful completion of the research, oral defense of the dissertation, and demonstration of the required competencies listed above, the student is awarded the Ph.D. degree.

The Ph.D. concentration in epidemiology is designed to consist of 48 credit-hours of coursework over a minimum of two years plus one to four years for completion of the dissertation. The coursework outlined below represents an ideal sequence for a full-time student. A part-time student may need to deviate from this sequence. As part of the first block, a student is expected to complete required courses in basic and advanced epidemiologic methods that cover core areas including study design, research management, and statistical analysis; the survey course in

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disease biology and pathophysiology; and a minimum of 6 credit-hours of epidemiology seminars. The student must pass the proficiency examination before proceeding to minor electives and individual studies in the second block, which must include an additional 3 credit-hours of epidemiology seminars. Exceptions may be granted upon approval by the student's advisor and the department chair.

Coursework

48 total credit hours (beyond admission requirements) consisting of the following:

- 9 credit-hours of required courses
- 9 credit-hours of seminars in epidemiology
- 18-21 credit hours of epidemiology electives
- 6 credit hours of minor electives (outside of epidemiology)
- 3-6 credit-hours of mentored readings and research in epidemiology

<i>Required Coursework</i>			
<i>Semester</i>	<i>Course #</i>	<i>Course Title</i>	<i>Credit-Hours</i>
Block 1			
Fall I	PHEP 618	Epidemiologic Methods II	3
	-OR- PHEP-xxx	-OR if already taken - Epidemiology elective	3
	PHEP-619	Biology of Disease in Populations ^{B1}	3
	PHEP-xxx	Epidemiology elective	3
	PHEP-750	Seminars in Epidemiology ^{B1}	3
	Semester total		
Spring I	PHEP-701	Advanced Epidemiologic Methods ^{B1}	3
	PHEP-702	Epidemiologic Research Management ^{B1}	3
	PHEP-xxx	Epidemiology elective	3
	PHEP-750	Seminars in Epidemiology ^{B1}	3
	Semester total		
Block 1 total			24

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<i>Required Coursework</i>			
<i>Semester</i>	<i>Course #</i>	<i>Course Title</i>	<i>Credit-Hours</i>
Block 2			
Fall II	PHEP-xxx	Epidemiology elective	3
	PHEP-xxx	Epidemiology elective	3
	-OR- various	-OR- Minor elective	3
	various	Minor elective	3
	PHEP-750	Seminars in Epidemiology ^{B2}	3
	Semester total		12
Spring II	PHEP-xxx	Epidemiology elective	3
	Two of: PHEP-xxx various	Two of: Epidemiology elective Minor Elective	3 3
	PHEP-778	Readings and Research in Epidemiology	3
	PHEP-778	Readings and Research in Epidemiology ^{B2}	3
		Semester total	
Block 2 Total			24
Degree Total			48

Key: ^{B1} = required in Block 1
^{B2} = required in Block 2

Minor Elective Requirement

As a part of the approved program of study, the student is required to complete 6 credit-hours of coursework in a minor field of concentration. Areas directly relevant to the science of epidemiology are preferred, including, but not limited to, biostatistics, bioinformatics, medical geography, molecular or population genetics, environmental health, toxicology, microbiology, health management, health promotion and behavioral science, and clinical research. These courses may be selected from ones offered within the School of Public Health and Information Sciences, other departments within the University, or from sources outside the University with permission and acceptance of credit by the Graduate School.

Minor courses should be chosen by the student in consultation with his or her advisor and the respective course directors. Students may petition to take courses not on this list with approval of the instructor and the chair of the Department of Epidemiology and Population Health. The student must provide a written rationale for the choice of minor coursework in the program of study. The following is a partial list of approved minor courses. Some courses may have prerequisites, and the student is expected to either meet these or obtain permission from the instructor before registering.

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<i>Approved Electives for Minor Requirement</i>		
<i>Course #</i>	<i>Course Title</i>	<i>Credit-Hours</i>
BIOC-641	Advanced Eukaryotic Genetics	3
BIOC-660	Molecular Endocrinology	3
BIOC 661	Molecular Mechanisms of Toxicology (cross-listed as PHTX-661)	3
BIOC-668	Molecular Biology	3
BIOC-675	Cancer Biology	3
EXP-600	Physiology of Exercise	3
EXP-605	Human Physiology	3
GEOG-656	Spatial Statistics	3
GEOG-657	Geographic Information Systems	3
MBIO-687	Microbial Pathogenesis	3
MBIO-618	Topics in Advanced Microbiology	3
MBIO-680	Genetics of Infectious Diseases	3
NURS-670	Cancer Epidemiology and Pathophysiology	3
PHBI-750	Statistical Methods for Bioinformatics	3
PHBI-751	High-throughput Data Analysis	3
PHCI-501	Bench to Bedside	1
PHCI-602	Health Services and Outcomes Research	2
PHCI-610	New Drug and Device Development	2
PHCI-624	Clinical Trials I: Planning and Design	2
PHCI-625	Clinical Trials II	2
PHCI-632	Ethical Conduct of Healthcare Research	2
PHCI-650	Medical Decision Analysis	2
PHEH-650	Advanced Topics in Environmental and Occupational Health	3
PHMS-650	Advanced Topics in Health Management and Systems Science	3
PHPB-650	Advanced Topics in Health Promotion and Behavioral Science	1-3
PHST-650	Advanced Topics in Biostatistics	3
PHST-680	Biostatistical Methods I	3
PHST-681	Biostatistical Methods II	3
PHST-661	Probability	3
PHST-662	Mathematical Statistics	3
PHST-683	Survival Analysis	3
PHST-682	Multivariate Analysis	3
PHST-684	Categorical Data Analysis	3
PHST-785	Nonlinear Regression	3
PHTX-607	Seminar in Genetics and Molecular Medicine	3
PHTX-618	Topics in Pharmacology & Toxicology	3
PHTX-630	Toxicology: Principles and Application	3
PHTX-661	Molecular Mechanisms of Toxicology (cross-listed as BIOC 661)	3
PHZB-605	Systemic Physiology I	3
PHZB-611	Advanced Human Physiology	3

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Proficiency Examination

Upon successful completion of the first block of required coursework, the student is eligible to sit for the written proficiency examination, which is administered by a committee of departmental faculty appointed by the chair. The timing of the proficiency examination is determined by the student's faculty advisor and the department chair. The subject matter includes basic knowledge of disease biology and pathophysiology; theory and skills in epidemiologic research methods, including study design and management; and quantitative analytic methods. A student who does not successfully pass the proficiency examination is allowed a second opportunity to pass the exam. Failing the proficiency examination the second time results in dismissal from the program.

Candidacy Examination

After passing the proficiency examination and upon completion of the second block of coursework, the student is eligible to sit for the written and oral candidacy examination, which is administered by a committee appointed by the department chair and composed of departmental faculty and Graduate School faculty in the student's minor area to be. The subject matter includes knowledge of advanced epidemiologic methods; specialized knowledge pertaining to the minor field of concentration; disease biology and pathophysiology, which may be tailored to the student's special area of interest; and knowledge of the research process. Successful passage of the candidacy examination admits the student to doctoral candidacy. A student who does not successfully pass the candidacy examination may be required to take additional or remedial coursework and is allowed a second opportunity to pass the exam. Failing the candidacy examination the second time results in dismissal from the program.

Dissertation

A dissertation is required of every candidate for the degree of doctor of philosophy in public health sciences with a concentration in epidemiology. The dissertation is a scholarly achievement in research and presents an original contribution to knowledge and should demonstrate a thorough understanding of research techniques in epidemiology and the ability to conduct independent research. The following sections summarize the basic requirements for the dissertation committee, dissertation proposal, and defense. Additional details are available in the department's document "Student Advising, Thesis and Dissertation Committees."

Dissertation Committee

The dissertation is read by a dissertation committee, chaired by the student's faculty advisor and appointed by the Dean of the School of Graduate and Interdisciplinary Studies on the recommendation of the chair of the department. The committee consists of five members and must include one representative of an allied department. The dissertation must be approved by the committee and the chair of the department.

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Dissertation Proposal

After successful completion of the candidacy examination, a doctoral candidate must submit a written dissertation proposal to the members of the dissertation committee. The candidate is then orally examined on the dissertation proposal.

Dissertation Preparation

The dissertation is prepared with the format and binding according to the guidelines of the School of Interdisciplinary and Graduate Studies.

Dissertation Approval

The dissertation is submitted in completed form to the chair of the department at least thirty days before the end of the term in which the candidate expects to be graduated, and the candidate is not eligible for final examination until the dissertation has been received by the committee and chair.

The dissertation committee schedules an oral defense by the candidate. The time and place for the defense is published to the general academic community, members of which are free to attend the defense. The dissertation is approved by a majority vote of the committee and the concurrence of the department chair.

Dissertation Distribution

One unbound copy of the dissertation, signed by the dissertation committee, must be deposited with the Office of the School of Interdisciplinary and Graduate Studies before graduation.

Program Data

Name: Doctor of Philosophy in Public Health Sciences, Concentration in Epidemiology
Degree: Ph.D.
Department: Epidemiology and Population Health
School/College: School of Public Health and Information Sciences
Version: 2008.05.14
History: v2006.10.11 Submitted 09/20/06. Approved 10/24/06.
-1: 07/18/07: prefix PHKC changed to PHPB.
-2: 07/20/07: reformatted and reorganized to match template;
expanded dissertation section.
v2008.05.14: Submitted 05/27/08. Approved TBD.
Required coursework changed; coursework divided into two blocks;
List of approved minor electives expanded; proficiency exam added;
candidacy exam description revised; edited to meet university
styleguide.
Data updated: 05/27/08