

# Milken Institute School of Public Health

THE GEORGE WASHINGTON UNIVERSITY

## Department of Environmental and Occupational Health

### PhD Environmental Health 2020-2021

Note: All curriculum revisions will be updated immediately on the website  
<http://www.publichealth.gwu.edu>

#### Program Directors

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#### Mission

The Mission of the Environmental Health Ph.D. program is to educate individuals focused on developing new knowledge in the methods or applications of environmental health sciences that translates to environmental public health policy and practice. Our scholars will advance knowledge in analysis and laboratory sciences.

#### Goals

The goals of the Environmental Health PhD program are to ensure that graduates:

1. Demonstrate skills across a wide range of epidemiologic and biostatistical theories and methods;
2. Utilize knowledge in environmental public health risk sciences;
3. Understand general and specialized concepts and methodologies for scientific research in environmental health;
4. Understand and identify data that scientifically addresses environmental health disparity issues related to environmental justice, occupational exposures and global inequities in exposures and susceptibilities;
5. Demonstrate ability to work in interprofessional settings, *e.g.*, in collaboration with quantitative, environmental, physical, and social scientists;
6. Understand and abide by guidelines for ethical research practice and responsible conduct of research;
7. Understand how to identify and appropriately work with communities from which research subjects are drawn and/or those who are most impacted by the conduct and results of the research;
8. Conduct independent research, analyze data, and communicate results;
9. Disseminate research findings to scientific and lay audiences.

#### Program Requirements

All Milken Institute School of Public Health (SPH) EH PhD students are required to have a bachelor's degree in a relevant field. Students will take specific foundational courses (22 credits), core courses (21 credits), Tailoring Courses (specific electives) (15 credits) and Dissertation Preparation and Research (14 credits).

## **Competencies**

Upon completion of the PhD in Environmental Health students will be able to:

### **Demonstrate understanding of general and specialized Environmental Health concepts:**

- Synthesize advanced knowledge of EH concepts including environmental and occupational epidemiology, exposure science, environmental microbiology, environmental and occupational public health policy, and risk analysis and demonstrate depth of knowledge in a specific field of environmental health
- Understand the biological basis of EH-related disease across the lifespan and in the context of genetic, social and other factors
- Critically assess differential risks in relation to age, gender, environmental inequities, occupational health settings and global inequities
- Describe the analytic, social and ethical issues relevant to managing EH risks in communities, occupational settings, nations and globally
- Characterize the role of models and measurements in EH research and risk analysis
- Identify key gaps in EH knowledge and demonstrate the ability to apply scientific understanding to develop new models or hypotheses to address these gaps that are placed in the context of existing literature and identify experimental or analytic approaches to address them

### **Develop a research proposal:**

- Produce a structured proposal of a novel research study including the background, study hypotheses, design, methodology, and contribution to the field
- Synthesize and identify gaps and/or limitations of published research and present appropriate hypotheses to address gaps
- Develop a laboratory or non-laboratory-based research protocol that includes identification of data sources and evaluation of appropriate instruments for data collection, the advantages and disadvantages of different study designs, and sources of potential bias
- Obtain necessary approvals with regard to human subjects, biosafety, laboratory safety. Where appropriate identify and work with communities who are subjects and/or who are specifically impacted by the research

### **Conduct research and analyze data:**

- Demonstrate proficiency in study design, data collection analysis and synthesis, and interpretation of results in the context of the current state of the science as well as the implications for policy and/or practice of environmental and/or occupational public health
- Demonstrate ethical conduct of research and compliance around data sharing, human subjects, laboratory safety, and/or biosafety

### **Disseminate research findings:**

- Report research objectively, insightfully, and in the context of theory and prior research
- Communicate dissertation results to scientific communities and/or lay audiences through presentations at conferences, publications in the peer-reviewed literature and, where applicable, communications to the general public, health professional groups and/or policy makers

<b>Required Foundation Courses 25 Credits</b>		
		<b>Credits</b>
PUBH 6080	Pathways to Public Health	0
PUBH 6002	Biostatistical Applications for Public Health	3
PUBH 6003	Principles and Practice of Epidemiology	3
PUBH 6011	Environmental and Biological Fundamentals of Public Health	3
PUBH 6131 or PUBH 6853	Quantitative Methods in Environmental and Occupational Health OR Use of Statistical Packages for Data Management and Data Analysis	3
PUBH 6247	Design of Health Studies	3
PUBH 8110	Research Rotation (3 x 2 credits each)	6
UNIV 0250	Graduate Teaching Assistant Certification	0
PUBH 8415	Instructional Leadership (x2)	4
<b>Required Core Courses 21 Credits</b>		
		<b>Credits</b>
PUBH 8411	Advanced Topics – Principles of Environmental Health Risk Science – Doctoral Seminar	3
PUBH 8412	Advanced Topics – Environmental and Occupational Health Research and Practice	3
PUBH 6144 + 8144	EH Data Development & Modeling* + Advanced EH Data Development & Modeling	2+1
PUBH 8116	Communicating Research Results	3
PUBH 6121	Environmental and Occupational Epidemiology	3
PUBH 6123	Toxicology: Applications for Public Health	3
PUBH 6126	Assessment and Control of Environmental Hazards	3

<b>Example Tailoring Courses 12 Credits Minimum</b>		
		<b>Credits</b>
PUBH 6127	Applied Environmental Health Microbiology	2
PUBH 6128	Global Environmental and Occupational Health	2
PUBH 6130	Sustainable Energy and the Environment	2
PUBH 6133	Social Dimensions of Climate Change and Health	3
PUBH 6135	Researching Climate Change and Health	3
PUBH 6140	Global Climate Change and Air Pollution	2
PUBH 6199	Microbiomes and Microbial Ecology in Public Health	2
PUBH 6252	Advanced Epidemiologic Methods	3
PUBH 6863	Applied Meta-analysis	1
PUBH 6887	Applied Longitudinal Data Analysis	3
PUBH 8419	Measurement in Public Health and Health Services	3
PUBH 8242	Clinical Epidemiology and Decision Analysis	3
PUBH 8244	Cancer Epidemiology	3
PUBH 8245	Infectious Disease Epidemiology	3
PUBH 8364	Quantitative Methods	3
MICR 8230	Fundamentals of Genomics	3
MICR 8230	Molecular and Cellular Immunology	3
BMSC 8230	Molecular Basis of Human Disease	3
CHEM 6281	Environmental Chemistry: Air, Water, and Soil	3

CHEM 6282	Green Industrial Chemistry	3
<b>Dissertation Research (14) Credits</b>		
PUBH 8422 or 8435	Dissertation Proposal Writing	2
PUBH 8999	EH Dissertation Research	12
<b>Total</b>		<b>72</b>

**Graduate Teaching Assistant Certification (UNIV 0250).** Successful completion of this certification is required prior to taking on role as teaching assistant. This online certification is paid for by GW. The 1-credit earned for this certification does not count toward the PhD degree program requirements.

**Pathways to Public Health course (PUBH 6080).** As an accredited School of Public Health, curriculum in all graduate academic programs must provide a foundation in public health. If a student already holds a Master of Public Health degree from an accredited program or school of Public Health, this course will be waived. Otherwise, this zero-credit, free, online course should be completed within one year of matriculation.

**Transfer credit.** A student entering with a master's degree may transfer up to 24 credits toward the PhD coursework requirements. The remaining 48 hours of coursework and dissertation research will still be required, including research rotations and instructional opportunities.

**Tailoring courses.** Different tailoring courses may be considered. Seek advisors approval.

## Graduation Requirements

- 1. Integrity Quiz & Plagiarism.** In the first semester as a PhD student, all students should review the George Washington University's Code of Academic Integrity, take the quiz and submit documentation to the School of Public Health's Office of Student Records.
- 2. CITI Training requirement.** All students are required to complete training regarding human subject protection regulation and the Health Insurance Portability and Accountability Act of 1996 (HIPAA). To fulfill this requirement, you must complete the Collaborative IRB Training Initiative (CITI) Course in The Protection of Human Research Subjects.
- 3. Credits.** Successful completion of required foundational, core, and tailoring course credits.
- 4. Grade point average.** A minimum overall grade point average of 3.0.
- 5. Comprehensive examination.** After completion of course requirements, students will take a comprehensive exam based on the core courses, typically at the end of the second year. Upon successful completion of the exam, students officially enter the doctoral candidacy phase of the program.
- 6. Proposal defense.** Doctoral candidates prepare a written dissertation research proposal with guidance from their dissertation advisor and committee. Each doctoral candidate gives an oral presentation and defense to the committee who determines the student's readiness to commence the dissertation.
- 7. Dissertation.** Doctoral candidates are required to conduct original research on a contemporary public health problem or issue. The dissertation will consist of 3 academic manuscripts and the student gives an oral defense to the dissertation committee. One manuscript must be submitted to a peer-review journal prior to graduating.
- 8. Professional Enhancement.** Students must complete 8 hours of professional enhancement activities. This can be accomplished through participation in seminars, workshops, professional meetings and other appropriate functions. Students should seek prior approval from their academic advisor to make sure it will meet the requirement and obtain proof of attendance. Documentation of attendance to the event should be submitted to the School of Public Health's Office of Student Records.
- 9. Timeline.** The degree must be completed within seven years of matriculation. Degrees are awarded each semester, though formal commencement ceremonies, including the doctoral hooding ceremony, only occur in May. Students are eligible to participate in graduation activities only after they have completed all degree requirements and have no financial obligations to the University.