

School of Public Health and Health Services
Department of Epidemiology and Biostatistics
Master of Science Public Health Microbiology and
Emerging Infectious Diseases
2012-2013

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

Program Director for the Epidemiology Courses

Dr. Daniel Hoffman
Professor of Epidemiology & Biostatistics
21000-W Pennsylvania Avenue
8th Floor
Washington, DC 20037
Tel: 202-994-7770
Fax: 202-994-0082
Email: dhoffman@gwu.edu

Program Directors for the Microbiology Courses

Dr. Jeffrey Bethony
Associate Professor
Microbiology, Immunology,
and Tropical Medicine
Ross Hall, Room 727
2300 Eye Street, NW
Washington, DC 20037
Tel: use email
Fax: 202-994-2913
Email: jbethony@gwu.edu

Dr. Jeffrey J. Sich
Associate Professor & Director
of Educational Programs
Microbiology, Immunology and
Tropical Medicine
Ross Hall, Room 731B
2300 Eye Street, NW
Washington, DC 20037
Phone: 202-994-7613
E-mail: jsich@gwu.edu

Mission

The mission of the MS degree in Public Health Microbiology and Emerging Infectious Diseases is to provide training to a new generation of public health professionals to expand knowledge and expertise in the areas of disease mechanisms, with an emphasis on microbial pathogens, the use and application of modern biotechnologies and in epidemiologic skills relevant to the prevention and control of problems in the community arising from infectious diseases.

Graduates of the MS program will have an in-depth understanding of the major laboratory, clinical, and public health aspects of humankind's microbial pathogens, and acquire epidemiologic skills relevant to the prevention and control of problems arising from infectious diseases and modern biotechnologies. Areas of emphasis will include: the design and analysis of epidemiologic data; emerging infections; tropical diseases; Class A, B, C biological agents linked to bioterrorism; and applications of genomics, proteomics, and bioinformatics. MS graduates will be employed in academic and industrial research laboratories, international health agencies, NGOs, and private consulting groups. In addition, they may work in federal, state, and local public health agencies or state and local public health laboratories where their technical expertise and population-based perspective will be extremely useful. Students earning this degree will help meet a national demand that has reached critical proportions for a trained workforce in biodefense and emerging infections, and an international demand for training in diseases that affect the developing countries.

This MS program combines the strengths of two academic departments at the George Washington University Medical Center (GWUMC), one in the School of Public Health and Health Services (Department of Epidemiology and Biostatistics) and the other in the School of Medicine and Health Sciences (Department of Microbiology, Immunology, and Tropical Medicine).

Goals

The goals of the MS Program in Public Health Microbiology and Emerging Infectious Diseases are to ensure that graduates:

- Understand the biological complexities of microbial pathogens and the diseases they cause
- Recognize the major epidemiologic and clinical features of microbial diseases

Master of Science in Public Health Microbiology and Emerging Infectious Diseases

- Understand how new biotechnologies (including genomics, proteomics, and bioinformatics) can be applied to the study and control of microbial pathogens
- Develop an in-depth understanding of epidemiologic principles and practice
- Apply the principles of epidemiology, microbiology and public health practice toward the detection, surveillance, investigation, and control of microbial diseases

Course Requirements

The total 45 credit hours are distributed approximately evenly between the SPHHS (primarily the Department of Epidemiology and Biostatistics) and the SMHS (Department of Microbiology and Tropical Medicine). It is expected that most students will complete the degree in approximately two years.

All of the required courses except for MICR 8210 are offered in the late afternoon, so it is practical in many cases for students to work full-time

Course/Credit Distribution

Public Health Credits	
<input type="checkbox"/> Required Public Health Core Credits (6 credits)	19
<input type="checkbox"/> Required Epidemiology and Biostatistics Program-Specific Credits (13)	
Microbiology, Immunology, and Emerging Infectious Diseases Credits	17
Elective Credits (Either PubH or MICR)	4
Field/Laboratory Experience (PubH)	2
Final Project Credits (MICR)	3
Total 45	

Admissions Requirements

The Admissions Committee requires students to have the following prerequisites to apply to this degree:

- Bachelor’s degree in the life sciences or at least 12 credits in the biological sciences other than botany.
- Chemistry ≥ 3 Credits
- Physics ≥ 3 Credits
- 1 semester of calculus required; 2 semesters recommended.
- All prerequisites must be completed before matriculating.

Competencies

- Knowledge of the biological, environmental, and socio-behavioral determinants of human diseases, and of the public health impacts of disease. Courses: PubH 6003
- Knowledge of the laboratory characteristics of bacterial, viral, and parasitic pathogens, as well as biological Class A, B, C agents associated with bioterrorism. Courses: MICR 6220, MICR 6233, MICR 6235, MICR 6292, MICR 6239, MICR 8210, PubH 6275
- Knowledge of the clinical manifestations of infectious agents. Courses: MICR 6239, MICR 6292
- Knowledge of the principles of genomics, proteomics, and bioinformatics. Courses: MICR 6236, MICR 6237
- Knowledge of the principles of microbial disease surveillance and epidemiology. Courses: PubH 6245
- Skills to identify and analyze patterns of disease, to postulate hypotheses, to plan and implement studies (including outbreak investigations and analytic studies), to analyze, interpret and communicate results, and to evaluate the public health impact of such efforts. Courses: PubH 6003, PubH 6002, MICR 6239, PubH 6245, PubH 6247, PubH 6249, PubH 6262, MICR 6292
- Knowledge of public health roles and procedures of biomedical and public health laboratories, and skills relevant to working in such laboratories. Course: MICR 6238, PubH 6275

The curriculum sheet that follows describes the requirements for the MS Public Health Microbiology and Emerging Infectious Diseases program.

School of Public Health and Health Services				
Master of Science Public Health Microbiology and Emerging Infectious Diseases 2012-2013 Program-at-a-Glance				
Prerequisites				Credits
Preference Given to Applicants with Biological or Public Health Laboratory Experience				
Biological Sciences other than Botany				≥ 8
Chemistry				≥ 3
Physics				≥ 3
Mathematics or Computer Science beyond introductory level				≥ 3
Required Public Health Core Courses – 6 Credits				
Course Title		Credits	Semester Offered	
PubH 6002	Biostatistics Applications for Public Health	3	Fall, Spring, Summer	
PubH 6003	Principles and Practice of Epidemiology	3	Fall, Spring, Summer	
Required Epidemiology and Biostatistics Program Specific Courses - 13 Credits				
Course Title		Credits	Semester Offered	
PubH 6245	Infectious Disease Epidemiology	2	Spring	
PubH 6247	Design of Health Studies	3	Fall, Spring	
PubH 6249	Use of Statistical Packages: Data Management and Data Analysis	3	Fall, Spring	
PubH 6259	Epidemiologic Surveillance in Public Health	2	Spring	
PubH 6262	Introduction to Geographic Information Systems	1	Fall, Spring, Summer	
PubH 6275	Essential Public Health Laboratory Skills	2	Spring	
Required Microbiology, Immunology, and Tropical Medicine Courses - 17 Credits				
Course Title		Credits	Semester Offered	
MICR 6220	Biology of Parasitism	2	Spring	
MICR 6233	Virology	3	Spring	
MICR 6236	Fundamentals of Genomics	2	Fall	
MICR 6238	Public Health Laboratory Workshop	2	Summer	
MICR 6239	Interdisciplinary Medical Microbiology	3	Fall (Year 2)	
MICR 6212	OR Pathogenic Bacteriology	3	Fall (Year 2)	
MICR 6292	Tropical Infectious Diseases	2	Spring	
MICR 8210	Infection and Immunity	3	Spring (Year 1)	
Elective Courses - 4 credits				
Course Title		Credits	Semester Offered	
PubH 6004	Env. and Occup Health in a Sustainable World	2	Fall, Spring, Summer	
PubH 6127	Applied Environmental Health Microbiology	2	Spring	
PubH 6252	Advanced Epidemiology Methods	3	Spring	
PubH 6250	Epidemiology of HIV/AIDS	2	Fall	
PubH 6253	Issues in HIV/AIDS Care and Treatment	1	Fall	
PubH 6263	Advanced Geographic Information Systems(GIS)	1	Fall	
PubH 6271	Disaster Epidemiology: Methods and Applications	1	Summer	
PubH 6274	Emerging Infectious Diseases for PH Professionals	2	Fall	
PubH 6399	Homeland Security and Public Health	1	Varies	
MICR 6235	Human and Transforming Viruses	3	Fall	
MICR 6230	Molecular and Cellular Immunology	3	Fall	
MICR 6229	Immunobiology of Infection	2	Spring	
MICR 6212	Pathogenic Bacteriology	3	Fall	
MICR 6237	Fundamentals of Proteomics	2	Spring	

Master of Science in Public Health Microbiology and Emerging Infectious Diseases

MICR 6277	Seminar Series in Microbiology I	2	Spring	
MICR 6278	Seminar Series in Microbiology II	1	Spring	
MICR 6293	Special Topics in Microbiology	Var.	Fall, Spring, Summer	
Electives	Approved by Advisor	2		
Field/Laboratory Experience and Final Project - 5 Credits				
Course Title		Credits	Semester Offered	Grade
PubH 6016	Field/Laboratory Experience	2	Summer, Fall, Spring	
MICR 6294	Final Project	3	Fall, Spring Summer	