

Milken Institute School of Public Health

THE GEORGE WASHINGTON UNIVERSITY

Milken Institute School of Public Health
Department of Epidemiology and Biostatistics

Master of Public Health
Biostatistics
2018-2019

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

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Mission Statement

The mission of the Biostatistics Program is to educate graduate students in developing the necessary methodological and quantitative skills to successfully apply statistical methods to the biological, biomedical and health services sciences. In addition to enhance students' capacity to think critically and creatively, we are determined to deepen their commitment to improving the public's health, to engaging in and promoting public service – qualities that are essential for future biostatisticians and public health practitioners.

Goals

The goals of the Biostatistics Program are to ensure that graduates:

- ◆ Understand and adhere to high scientific standards for research;
- ◆ Understand how to apply statistical methods to biological/biomedical sciences and health services
- ◆ Understand and follow guidelines for ethical treatment of research participants;
- ◆ Communicate research findings to a lay audience; and
- ◆ Respect cultural diversity throughout all of the above.

Course Requirements

The MPH degree program in biostatistics consists of 45 credits. These credits are based on a series of Core Courses (15 credits) and Program-Specific Courses (19 credits), and electives (7 credits). The total 45 credit program also includes a Practicum (2 credits) and a Culminating Experience (2 credits) where students apply their didactic education in a real-world setting.

Program Prerequisites

All applicants to the MPH Biostatistics degree program must have completed two semesters of college level calculus through Calculus II with a grade of B or better to be considered for admission.

Program-Specific Competencies

The specialization in Biostatistics focuses on developing students' skills in the statistical analysis and interpretation of health research data. The following competencies were developed in concert with professors of biostatistics courses (at GWU as well as from other CEPH-accredited MPH programs), biostatistics textbooks, conversations with prospective employers likely to hire MPH-biostatistics graduates, and with experience teaching biostatistics courses to MPH students. ASPH Education Committee competencies were also consulted.

Upon completion of the MPH in Biostatistics, students will demonstrate functional competence to:

- Enumerate and apply the underlying principles and methods to design, plan, and conduct public health and biomedical studies including cohort, case control, cross-sectional, and clinical trials. Relevant courses: PUBH 6299*, 6247, 6252, 6258, 6260, 6014, and 6015.

- Conduct data analysis and interpret the results from public health and biomedical studies including cohort, case control, cross-sectional, and clinical trials. Relevant courses: PUBH 6299*, 6249, 6252, 6258, 6260, 6264, 6266, 6014, 6015.
- Manipulate various databases from large scale epidemiological studies and clinical trials studies using statistical software, e.g. SAS®. Relevant course: PUBH 6299*, 6249, 6252, 6258, 6260, 6266, 6014, 6015.
- Use theoretical biostatistical concepts in an applied setting to identify the appropriate data analysis methods for public health and biomedical studies including cohort, case control, cross-sectional, and clinical trials. Relevant courses: PUBH 6249, 6258, 6260, 6264, 6266, 6014, 6015.
- Synthesize data and relevant literature and interpret findings from statistical analyses in a causal framework, in order to prepare manuscripts and make oral presentations for both professional and lay audiences. Relevant courses: PUBH 6299*, 6249, 6252, 6258, 6260, 6264, 6266, 6014, 6015.
- Work as a member of a multidisciplinary research team and recognize and appropriately respond to ethical issues that arise in research. Relevant courses: PUBH 6299*, 6247, 6249, 6252, 6258, 6260, 6266.
- Provide biostatistical advice as a member of a team of researchers engaged in a biomedical or epidemiological research project. Relevant courses: PUBH 6299*, 6249, 6252, 6258, 6260, 6266, 6014, 6015.
- Apply biomedical and epidemiological concepts in identifying and describing the determinants and the distribution of disease in human populations which is the necessary background for successful participation in studies of health and disease. Relevant courses: PUBH 6247, 6252, 6014, 6015.
- Identify and assess patterns of emerging diseases to postulate hypotheses and to propose appropriate strategies in order to quantitatively evaluate the impact of health problems. Relevant courses: PUBH 6299*, 6247, 6249, 6252, 6258, 6260, 6266, 6014, 6015
- Comprehend basic ethical and legal principles pertaining to the collection, maintenance, use and dissemination of biomedical and epidemiologic data. PUBH 6247, 6252, 6258, 6260, 6266, 6014, 6015

*Selected biostatistics topics/electives including PUBH 6262

Sample Special Project Topics

Longitudinal Assessment of Disease Severity Markers in Renal Patients
 Analysis of USDA Data Trends on Toxic Residues in Animal Food Sources
 Alternative Methods for Analyzing Knee Surgery Outcome Data
 Correlates of Cerebral Spinal Fluid Substances in HIV Patients
 Development of a Prediction Model for Mortality in ICU Patients

Sample Culminating Experience Topics

Cancer:

- Inflammatory Breast Cancer
- Disparities in Cancer Diagnosis and Treatment
- Associations between Behavioral Factors and Cancer

HIV/AIDS:

- Use of Technology in the Care of HIV
- Infected Individuals
- Care of Pediatric and Adolescent HIV-Infected Patients
- Adherence to Antiretroviral Medications
- Development of Resistance to Antiretroviral Medications

Infectious Disease:

- Listeria at Meat Packaging Plants
- Food Contamination and Surveillance

Other:

- Racial/Ethnic Disparities in Low Birth Weight
- Use of Standardized Case Definitions in Adverse Events following Immunization Surveillance

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**Master of Public Health
Biostatistics Program
Program-at-a-Glance
2018-2019**

Begin Planning Your Practicum During Year 1

| Required Core Course | | Credits | Semester Offered | Grade |
|---|--|-----------|-------------------------------|-------|
| PUBH 6001 | Biological Concepts for Public Health | 2 | Fall, Spring, Summer I | |
| PUBH 6002 | Biostatistical Applications for Public Health | 3 | Fall, Spring, Summer 10 wk | |
| PUBH 6003 | Principles and Practice of Epidemiology | 3 | Fall, Spring, Summer 10 wk | |
| PUBH 6004 | Environmental and Occupational Health in a Sustainable World | 2 | Fall, Spring, Summer I | |
| PUBH 6006 | Management and Policy Approaches to Public Health | 3 | Fall, Spring, Summer | |
| PUBH 6007 | Social and Behavioral Approaches to Public Health | 2 | Fall, Spring, Summer I | |
| Total | MPH Core Credits | 15 | | |
| Required Program-Specific Courses | | | | |
| PUBH 6247 | Design of Health Studies | 3 | Fall, Spring | |
| PUBH 6249 | Use of Statistical Packages: Data Management and Data Analysis | 3 | Fall, Spring | |
| PUBH 6252 | Advanced Epidemiologic Methods | 3 | Fall, Spring | |
| PUBH 6258 | Advanced Topics in Biostatistical Consulting | 1 | Spring | |
| PUBH 6260 | Advanced Data Analysis for Public Health | 3 | Fall, Spring | |
| PUBH 6264 | Quantitative Methods | 3 | Spring | |
| PUBH 6266 | Biostatistical Methods | 3 | Fall | |
| Total | Program Specific Credits | 19 | | |
| Electives | | | | |
| PUBH 6xxx | Any SPH (PUBH, HSML, EXNS) graduate level course | 7 | Summer, Fall, Spring | |
| Practicum and Culminating Experience | | | | |
| PUBH 6014.10 | Practicum | 2 | See advisor | |
| PUBH 6015.10 | Culminating Experience | 2 | See Advisor | |
| Total | Practicum & CE | 4 | | |
| Course Distribution | | Credits | | |
| Public Health Core Courses | | 15 | | |
| Required Program-Specific Courses | | 19 | | |
| Electives-Epi-Bio Courses with Advisor's Approval | | 7 | | |
| Practicum | | 2 | | |
| Culminating Experience | | 2 | | |
| Total Degree Credits | | 45 | | |

Graduation Requirements

MPH

1. **Graduate Credit Requirement:** 45 graduate credits are required.
2. **Course Requirements:** Successful completion of the Core Courses and the Program-Specific Courses are required.
3. **Grade Point Requirement:** A 3.0 (B average) overall grade point average is required.
4. **Time Limit Requirement:** The degree must be completed within four years.
5. **Transfer Credit Policy.** Up to 12 graduate credits that have not been applied to a previous graduate degree may be transferred to the MPH. External credits must have been earned from an accredited institution in the last 3 years with a grade of 3.0 (B) or better. SPH Graduate Certificate students can transfer as many credits as meet program requirements, up to 18 credits, to the MPH. Graduate Certificate students wishing to transfer to a degree program may apply to do so via the online change of concentration petition after completion of 3 or more courses and a cumulative GPA of 3.0 or better. A grade of B or better is required for a course to be eligible for transfer.
6. **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.
7. **Integrity Quiz & Plagiarism requirement:** All students are required to review the George Washington University Code of Academic Integrity and take the quiz within their first semester of study. The Code of Integrity and step-by-step instructions can be found here: <http://publichealth.gwu.edu/integrity>
8. **Professional Enhancement requirement:** Students must participate in 8 hours per degree program of advisor pre-approved Public Health-related lectures, seminars, and symposia, related to your field of study. Professional Enhancement activities supplement the academic curriculum and help prepare students to participate actively in the professional community. Opportunities for professional enhancement are regularly publicized via the Milken Institute SPH Listserv and through your department or advisor. Students must submit documentation of Professional Enhancement activities to the Office of Student Records. The documentation consists of the Professional Enhancement Form <http://publichealth.gwu.edu/academics/forms> (which includes a prior approval signature from the student's advisor, a description of the program agenda, and proof of attendance. Remember to submit your documentation before you apply to graduate!

Course Descriptions and Registration information can be found on the website:

<http://publichealth.gwu.edu/academics>

NOTE: Always see your advisor for course scheduling and sequencing strategies, but remember that proper course selection, fulfilling requirements, and on-time graduation are your responsibilities.

The Master of Public Health (MPH) curriculum consists of four types of courses:

- Required Core Courses (PUBH 6001, 6002, 6003, 6004, 6006, and 6007)
- Required Program-Specific Courses
- Electives
- Required Practicum and Culminating Experience

The MPH core courses are designed to provide students with a broad public health context as well as a critical foundation for subsequent coursework. Early completion of these core courses ensures that students will have the base of knowledge to successfully complete the program specific courses and to get as much as possible out of them. As such, entering students are expected to enroll in MPH core courses in accordance with the following guidelines:

- We expect MPH students to complete the MPH core courses in their first year following their admission into the program (fall/spring/summer).
- Students may take core courses in any order.

Part-time students (who generally take 5 to 7 credits per semester) will typically concentrate on taking just core courses in their first year, and then take program-specific courses in their second and third years.

In order to help assure that all students complete core courses in the first year of study, GW SPH will offer all core courses during all three semesters (fall, spring, and summer). This will allow students who wish to complete their MPH degree within two years to do so, and will allow every student to make steady progress toward completing the MPH degree. Most of the MPH Biostatistics program specific courses are offered twice in each academic year (fall/spring semesters).

We recognize that there may be exceptional circumstances that make it difficult for a student to complete core courses in the first year as outlined above. Any such student should discuss this situation with his or her academic advisor.

For additional information and resources regarding registration, course descriptions, schedule of classes, advising, etc. follow this link: <http://publichealth.gwu.edu/academics>

Table 1 (full time students) and Table 2 (part time students) present sample course schedules that students admitted to the MPH program in biostatistics can use as a guideline to structure their program of studies. It is noteworthy that in either sample course schedule a fully 45 credits are required to complete the degree, including core courses (15 credits), program specific courses (19 credits), Epi-Bio electives (7 credits) and the practicum (2 credits) and culminating experience (2 credits). See below.

**Milken Institute School of Public Health
MPH in Biostatistics (45 cr)**

Sample Schedule for 2-Year Completion (Summer start)

| Semester | Cr | Course # | Course Name | Time |
|--|----|-----------|---|--|
| Summer 1st year 5 credits | 3 | PUBH 6002 | Biostatistical Applications for Public Health | Mon 9:00 – 12 pm; Wed (lab) 9:00 – 10:30 am (10 wks) |
| | 2 | PUBH 6001 | Biological Concepts for Public Health | Tues and Thurs 3:45 – 6 pm (6 wks) |
| Fall 1st year 8 credits | 3 | PUBH 6003 | Principles and Practice of Epidemiology | Fri 3:10 – 6:00 pm |
| | 2 | PUBH 6004 | Environmental and Occupational Health | Tues 4:10 – 6:00 pm |
| | 3 | PUBH 6249 | Use of Stat Packages for Data Analysis | Tues 6:10 – 9:00 pm |
| Spring 1st year 9 credits | 2 | PUBH 6007 | Social Behavioral Approaches to Public Health | Tues 4:10 – 6:00 pm |
| | 3 | PUBH 6247 | Design of Health Studies | Wed 6:10 – 9:00 pm |
| | 3 | PUBH 6264 | Quantitative Methods | Wed 3:10 – 6:00 pm |
| | 1 | PUBH 6299 | Epi-Bio Course (advisor's approval) | |
| Summer 2nd year 6 credits | 3 | PUBH 6006 | Management and Policy Approaches to Public Health | Mon and Wed 12:10 – 3 pm (6 wks) |
| | 3 | PUBH 6299 | Epi-Bio electives | |
| Fall 2nd year 9 credits | 3 | PUBH 6252 | Advanced Epidemiologic Methods | Wed 6:10 – 9:00 pm |
| | 3 | PUBH 6266 | Biostatistical Methods | Tues 6:10 – 9:00 pm |
| | 1 | PUBH 6299 | Epi-Bio Elective | |
| | 2 | PUBH 6014 | Practicum | |
| Spring 2nd year 8 credits | 1 | PUBH 6258 | Advanced Topics in Biostatistical Consulting | Mon 4:10 – 6:00 pm |
| | 3 | PUBH 6260 | Advanced Data Analysis for Public Health | Tues 6:10 – 9:00 pm |
| | 2 | PUBH 6015 | Culminating Experience | |
| | 2 | PUBH 6299 | Epi-Bio Electives | |

6 credits of Epi-Bio –Any 6299 courses offered by the Epi-Bio Department. A student can substitute epi-bio electives with one statistics course with approval of the program director.

+ Both the Practicum and the Culminating Experience require substantial lead time to plan. Make sure that you start planning your Practicum the semester before you wish to conduct it. Make sure that you start planning your Culminating Experience approximately 2 semesters before you plan to complete it.

**Milken Institute School of Public Health
MPH in Biostatistics (45 cr)**

Sample Schedule for 3-Year Completion (Fall start)

| Semester | Cr | Course # | Course Name | Time |
|--|----|-----------|---|---|
| Fall 1st year 5 credits | 2 | PUBH 6001 | Biological Concepts for Public Health | Thurs 4:10 – 6:00 pm |
| | 3 | PUBH 6002 | Biostatistical Applications for Public Health | Weds 6:10 – 9:00 pm |
| Spring 1st year 7 credit | 3 | PUBH 6003 | Principles and Practice of Epidemiology | Thurs 3:10 – 6:00 pm |
| | 2 | PUBH 6004 | Environmental and Occupational Health | Tues 6:10 – 8:00 pm |
| | 2 | PUBH 6007 | Social and Behavioral Approaches to Public Health | Tues 4:10 – 6:00 pm |
| Summer 1st year 4 credits | 3 | PUBH 6006 | Management and Policy Approaches to Public Health | Mon and Wed 12:10 – 3 pm (6 wks) |
| | 1 | PUBH 6299 | Epi-Bio Elective | |
| Fall 2nd year 7 credits | 3 | PUBH 6247 | Design of Health Studies | Thurs 6:10 – 9:00 pm |
| | 3 | PUBH 6249 | Use of Statistical Packages for Data Analysis | Tues 6:10 – 9:00 pm + 1 hour computer lab |
| | 1 | PUBH 6299 | Epi-Bio Elective | |
| Spring 2nd year 7 credits | 3 | PUBH 6252 | Advanced Epidemiologic Methods | Thurs 3:10 – 6:00 pm |
| | 3 | PUBH 6264 | Quantitative Methods | Wed 3:10 – 6:00 pm |
| | 1 | PUBH 6299 | Epi-Bio Elective | |
| Summer 2nd year 3 credits | 3 | PUBH 6299 | Epi-Bio Electives | |
| Fall 3rd year 6 credits | 3 | PUBH 6266 | Biostatistical Methods | Tues 6:10 – 9:00 pm |
| | 1 | PUBH 6299 | Epi-Bio Elective | |
| | 2 | PUBH 6014 | Practicum | |
| Spring 3rd year 6 credits | 3 | PUBH 6260 | Advanced Data Analysis | Tues 6:10 pm – 9:00 pm |
| | 1 | PUBH 6258 | Advanced Topics in Biostatistical Consulting | Mon 4:10 pm – 6:00 pm |
| | 2 | PUBH 6015 | Culminating Experience | |

5 credits of Epi-Bio –Any 6299 courses offered by the Epi-Bio Department. A student can substitute epi-bio electives with one statistics course with approval of the program director.

+ Both the Practicum and the Culminating Experience require substantial lead time to plan. Make sure that you start planning your Practicum the semester before you wish to conduct it. Make sure that you start planning your Culminating Experience approximately 2 semesters before you plan to complete it.