



Epidemiology and Biostatistics

Epidemiology and biostatistics are the quantitative sciences of public health, investigating causes and prevention of disease and injury, and assessing patterns of health in populations around the globe. This certificate provides training in design, statistical programming, data analysis, and valid interpretation of experimental (e.g. clinical) trials and observational studies. Students will gain knowledge and skills in the methods required to conduct and communicate public health research.

Upon graduation, students will be able to:

- Calculate and apply appropriate epidemiologic and statistical measures to draw valid inferences and summaries from public health data.
- Evaluate the strengths and limitations of epidemiologic and statistical reports from public health studies.
- Analyze key sources of public health data, reflecting comprehension of the basic ethical and legal principles pertaining to the collection, maintenance, analysis, and dissemination of epidemiologic and public health information.
- Synthesize the results of epidemiologic and statistical analyses to craft public health messages in written/oral presentations for both public health professionals and external audiences. Demonstrate the application of epidemiology and biostatistics for informing etiologic research, planning, and evaluation of interventions, public health surveillance, or health policy.
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Course Requirements

- **BS 723** Introduction to Statistical Computing (4 cr) or **BS 730** Introduction to R: Software for Statistical Computing (4 cr)
- **EP 770** Concepts and Methods in Epidemiology (4 cr)
- *4 credits of the following study criticism courses:*
 - **EP 722** Data Collection Methods for Epidemiologic Research (2 cr)
 - **EP 730** Epidemiology of Vaccine Preventable Diseases (2 cr)
 - **EP 740** Introduction to the Epidemiology of Aging (2 cr)
 - **EP 748** Drug Epidemiology (4 cr)
 - **EP 752** Cancer Epidemiology (4 cr)
 - **EP 755** Infectious Disease Epidemiology (4 cr)
 - **EP 758** Nutritional Epidemiology (4 cr)
 - **EP 759** Reproductive Epidemiology (4 cr)
 - **EP 764** Epidemiology of HIV/AIDS in the Developed and Developing World (2 cr)
 - **EP 775** Social Epidemiology (4 cr)
 - **EP 784** Epidemiology of Tuberculosis in the Developed and Developing World (2 cr)
 - **EP 790** Mental Health Epidemiology (4 cr)
 - **EP 850** Applications of Intermediate Epidemiology (4 cr)
 - **EP 857** Design and Conduct of Cohort Studies (2 cr)
 - **EP 858** Design and Conduct of Case-Control Studies (2 cr)
 - **EH 757** Environmental Epidemiology (4 cr)
 - **GH 801** How to License a New Vaccine (4 cr)
 - **MC 759** Perinatal and Child Health Epidemiology (4 cr)
- *One of the following data analysis courses:*
 - **BS 805** Intermediate Statistical Computing and Applied Regression Analysis (4 cr)
 - **BS 820** Logistic Regression and Survival Analysis (4 cr)
 - **BS 835** Applied Intermediate Biostatistics (4 cr)
 - **BS 845** Data Science and Statistical Modeling in R (4 cr)
 - **BS 851** Applied Statistics in Clinical Trials I (4 cr)
 - **BS 852** Statistical Methods in Epidemiology (4 cr)
 - **BS 858** Statistical Genetics I (4 cr)



Integrative Learning Experience

Students in the Epidemiology and Biostatistics certificate will have the option to conduct a data analysis or critical evaluation of the published literature.

Career Paths

Graduates are well-suited to take on roles in a variety of settings, including academic research, contract research organizations (CRO's), governmental agencies, health delivery systems, insurers, pharmaceutical and biotechnology companies, medical device companies, and public health research firms. Possible job titles include Research Manager, Data Manager, Research Analyst, Data Analyst, Study Coordinator, Epidemiologist or Associate Epidemiologist, Biostatistician, Surveillance Epidemiologist, Public Health Officer, Consultant, and SAS Programmer.

Epidemiology and Biostatistics Electives Courses

- **BS 722** Design and Conduct of Clinical Trials (4 cr)
- **BS 728** Public Health Surveillance, a Methods Based Approach (2 cr)
- **BS 750** Essentials of Quantitative Data Management (2 cr)
- **BS 810** Meta-Analysis for Public Health & Medical Research (4 cr)
- **BS 821** Categorical Data Analysis (4 cr)
- **EP 721** Survey Methods for Public Health (4 cr)
- **EP 762** Clinical Epidemiology (4 cr)
- **EP 763** Genetic Epidemiology (4 cr)
- **EP 800** Microbes and Methods: Selected Topics in Outbreak Investigation (2 cr)
- **EP 813** Intermediate Epidemiology (4 cr)
- **EP 817** A Guided Epidemiology Study (4 cr)
- **EP 820** Perspectives on Epidemiologic Studies (2 cr)
- **EP 854** Advanced Epidemiology (4 cr)
- **EP 855** Advanced Epidemiology Seminar: Issues in Study Design (4 cr)
- **EP 860** Novel Analytical Methods for Epidemiology (4 cr)
- **EP 861** Quantitative Bias Analysis Methods for Epidemiologic Research (2 cr)
- **EP 862** Simulated Problems for Learning Epidemiology (SimPLE) (2 cr)
- **GH 811** Applied Research Methods in Global Health (4cr)
- **PH 780** Chronic Disease: A Public Health Perspective (2 cr)