

EPIB - EPIDEMIOLOGY AND BIOSTATISTICS

EPIB400 Obesity: An Epidemiologic Perspective (3 Credits)

The epidemic of obesity, its causes and consequences, and issues related to energy balance will be covered. Students will characterize the obesity epidemic both nationally and internationally, compare and contrast the metrics of obesity, understand the biological consequences of different obesity phenotypes, and describe characteristics of the obesogenic environment. Throughout the course students will be introduced to the application of epidemiological methods to studies of obesity.

Prerequisite: 1 course with a minimum grade of C- from (EPIB301, HLTH301).

EPIB463 Introduction to Biostatistical Programming (3 Credits)

An introduction to basic programming principles; data analysis tasks such as the calculation of summary statistics and the creation of graphs; and the implementation of statistical analysis concepts such as T-tests, ANOVA and correlation. Querying and managing data sets using SQL in SAS will also be covered.

EPIB489 Special Topics in Epidemiology or Biostatistics (1-6 Credits)

Special topics in epidemiology or biostatistics.

Repeatable to: 6 credits if content differs.

EPIB610 Foundations of Epidemiology (3 Credits)

Introduction to the discipline of epidemiology and its applications to health issues and practices. Basic epidemiologic concepts and methods will be covered.

Prerequisite: EPIB300; or equivalent undergraduate statistics or biostatistics course with a grade of C- or higher; or a score of 70% or higher on EPIB300 placement exam.

Credit Only Granted for: EPIB610 or HLTH720.

Formerly: HLTH720.

EPIB611 Intermediate Epidemiology (3 Credits)

Analysis of epidemiologic methods as applied to epidemiologic research, analysis of bias, confounding, effect modification issues, overview of design, implementation, and analysis of epidemiologic studies.

Prerequisite: 1 course with a minimum grade of B- from (SPHL602, EPIB610); or a minimum score of 70% on the SPHL602 or EPIB610 waiver exam.

EPIB612 Epidemiologic Study Design (3 Credits)

Application of epidemiologic study designs, analytic methods used for analysis of cohort, case-control, cross-sectional, and clinical trials research.

Prerequisite: EPIB611.

EPIB620 Chronic Disease Epidemiology (3 Credits)

Overview of prevalence and risk factors for major chronic diseases. Discussion of methodological issues unique to specific chronic disease.

Prerequisite: Must have completed or be concurrently enrolled in SPHL602; or EPIB610.

EPIB621 Infectious Disease Epidemiology (3 Credits)

Overview of the unique aspects of infectious diseases and the epidemiological methods used in their study, prevention, and control.

Prerequisite: Must have completed or be concurrently enrolled in SPHL602; or EPIB610.

EPIB622 Social Determinants of Health (3 Credits)

Overview of the major social variables that affect public health, including socioeconomic status, poverty, income distribution, race, social networks/support, community cohesion, psychological stress, gender, and work and neighborhood environment.

Prerequisite: Must have completed or be concurrently enrolled in SPHL602; or EPIB610.

EPIB623 Epidemiologic Methods in Health Disparities Research (3 Credits)

An examination of the measurement, monitoring, analysis, and reporting of health disparities in the U.S. Through in-depth examples and class activities, students will learn about the state of health disparities, epidemiologic methods for health disparity assessments, and best practices for translating data on health disparities for policy makers.

Prerequisite: Must have completed or be concurrently enrolled in SPHL602; or EPIB610.

EPIB624 Genetic in Public Health (3 Credits)

Emerging role of genetics in public health; overview of basic tenets of human genetics; examination of how public health practices and research are influenced by genetics and ethical issues specific to genetics.

Prerequisite: EPIB610.

EPIB626 Epidemiology of Obesity (3 Credits)

Overview of the epidemiological, prevention, and treatment of obesity, its causes and consequences, and energy balance issues; application of epidemiologic methods to the study of obesity epidemiology.

Prerequisite: Must have completed or be concurrently enrolled in SPHL602; or EPIB610.

EPIB627 Epidemiologic Methods for Primary Research (3 Credits)

Students are provided with the knowledge and skills needed to design and implement epidemiological research studies and to collect primary data. Presents an overview of types of research designs, sampling methodologies, measurement issues, questionnaire design, and guidelines for recruiting and interacting with participants. This foundation of knowledge is applied to group assignments, which apply the steps involved in the primary data collection process. Goals include: (a) achieving competence in designing and implementing studies based on scientifically sound epidemiological research methods; and (b) gaining the ability to critically evaluate health research and epidemiological studies.

Prerequisite: EPIB610; or permission of instructor.

Credit Only Granted for: EPIB600 or EPIB627.

Formerly: EPIB660.

EPIB630 Epidemiologic Methods in Sexual and Reproductive Health Research (3 Credits)

Examination of epidemiologic methods (quantitative and qualitative) for collecting and analyzing data on sexual and reproductive health. The emphasis will be to introduce students to the appropriate methods used for challenging and sensitive research topics such as sexual behavior, HIV/STI, drug use, sexual abuse.

Prerequisite: Must have completed or be concurrently enrolled in SPHL602; or EPIB610.

EPIB631 Cancer Epidemiology (3 Credits)

This combines public health disciplines including epidemiological methods, molecular biology, pathology, clinical and social/behavioral sciences to explore modern cancer epidemiology, prevention and control in the United States and internationally. Emphasis will be placed on those cancers of high prevalence or unique biological characteristics that illustrate interesting epidemiological or etiological characteristics.

Prerequisite: EPIB610; or must have completed or be concurrently enrolled in SPHL602; or permission from instructor.

Additional Information: This course is being jointly offered with the University of Maryland Baltimore and will be taught at the College Park campus.

EPIB633 Health Survey Design and Analysis (3 Credits)

An overview of types of survey research designs, questionnaire design, measurement issues, and techniques for recruiting and interacting with participants. Students will discuss and implement a variety of health survey analysis techniques, including how to utilize SAS statistical software to estimate descriptive statistics and implement regression models, while accounting for complex survey designs.

Prerequisite: SPHL602 or EPIB610; or permission of Instructor.

Recommended: EPIB697.

EPIB634 Applied Data Analysis in Social Epidemiology and Behavioral Health (3 Credits)

Focuses on the application of factor analysis, mediation analysis using path analytic model, and structural equation model in social epidemiology and behavioral health. Application of these analytical methods using SAS.

Prerequisite: EPIB610 and EPIB650; or permission of instructor.

EPIB635 Applied Multilevel Modeling in Health Research (3 Credits)

Multilevel modeling is a popular analytic technique in health research that collects data from participants at hierarchic levels, e.g., residents nested in neighborhoods, and patients in hospitals. The course covers topics in multilevel modeling including two- and three-level multilevel linear modeling, logistic regression model, modeling with ordered and nominal outcomes, as well as strategies for model building. This course focuses on the application of multilevel modeling, rather than mathematics. The instructor uses a step-by-step approach to teach this course with real-world examples. The course begins with an overview of the feature of multilevel data then transitions to the analytic foundations of multilevel models. Later lectures cover the use of multilevel modeling to predict the occurrence of an outcome (prediction model) and estimate the exposure-outcome association by controlling potential confounding and assessing interactions (association model).

Prerequisite: Working knowledge of fundamental statistical concepts, regression modeling, and SAS programming.

EPIB636 Professional Skills and Resilience (3 Credits)

This blended course is aimed at preparing students as future epidemiologists, biostatisticians, health statisticians, or public health analysts/advisors to meet new challenges in public health and build academic resilience and successful careers. Academic resilience, or increased likelihood of (academic) success despite environmental adversities can be promoted by focusing on alterable factors such as coping mechanisms, peer and family support, social connectedness, positive role modeling and mentorship, and intellectual stimulation. Through readings, discussions and exercises, students will develop soft skills required to be successful in the workplace (e.g., how to prepare for the job search, develop professional demeanor, personal interactions). Online training will supplement in-person course content to help students build positive nurturing professional relationships and networks, maintain positivity, develop emotional insight, achieve life balance, and become more reflective. Field trips and guest lectures to introduce students to potential employers and different work environments will be identified with student input.

Restriction: Enrollment in a UMD SPH graduate degree program.

EPIB637 Social Epidemiologic Methods in Health Equity Research (3 Credits)

Provides students with the knowledge and skills to design and implement social epidemiology studies related to investigating health inequities. Presents an overview of drivers of health inequities (e.g., racism, socioeconomic status) and conceptual and methodological challenges in empirically investigating these social determinants of health including issues related to confounding, selection bias, measurement error, and evaluation of mechanisms. Covers methodological approaches that can be used to address these challenges including instrumental variable analyses, difference-in-differences, mediation analyses using inverse odds ratio weighting, and qualitative analyses. This knowledge will be applied to exploring research questions of your choice. The course will foster a co-learning environment and recognize the value and strength of interdisciplinary perspectives. Curiosity and critical thinking are encouraged and supported.

Prerequisite: SPHL602 or permission of instructor.

EPIB641 Public Health and Research Ethics (1 Credit)

Overview and discussion of ethical issues that face public health practitioners and researchers.

EPIB650 Biostatistics I (3 Credits)

Basic statistical concepts and procedures for Public Health. Focuses on applications, hands-on-experience, and interpretations of statistical findings.

Prerequisite: EPIB300; or equivalent undergraduate statistics or biostatistics course with a grade of C- or higher; or a score of 70% or higher on EPIB placement exam.

Credit Only Granted for: EPIB650, HLTH651, or HLTH688B.

Formerly: HLTH651 and HLTH688B.

EPIB651 Applied Regression Analysis (3 Credits)

An introduction to important statistical methods used in public health research, including nonparametric hypothesis testing, ANOVA, simple and multiple linear regression, logistic regression, and categorical data analysis.

Prerequisite: 1 course with a minimum grade of B- from (SPHL602, EPIB650); or a minimum score of 70% on the SPHL602 or EPIB650 waiver exam.

Recommended: EPIB697 or previous experience working with SAS is highly recommended.

EPIB652 Categorical Data Analysis (3 Credits)

Methods for analysis of categorical data as applied to public health research, including contingency tables, logistic regression, multilevel models, loglinear models, and models for matched-pairs.

Prerequisite: EPIB651.

Recommended: EPIB697 or previous experience working with SAS is highly recommended.

EPIB653 Applied Survival Data Analysis (3 Credits)

Overview of statistical methods for analyzing censored survival data, including the Kaplan-Meier estimator, the log-rank test, Cox PH model.

Prerequisite: EPIB651.

EPIB654 Clinical Trials: Design and Analysis (3 Credits)

This course provides an introduction to the clinical trials design and data analysis. Topics covered include: history/background and process for clinical trial, key concepts for good statistics practice (GSP)/good clinical practice (GCP), regulatory requirement for pharmaceutical/clinical development, basic considerations for clinical trials, designs for clinical trials, classification of clinical trials, power analysis for sample size calculation for different designs, statistical analysis for efficacy evaluation, statistical analysis for safety assessment, implementation of a clinical protocol, statistical analysis plan, data safety monitoring, adaptive design methods in clinical trials (general concepts, group sequential design, dose finding design, and phase I/II or phase II/III design) and controversial issues in clinical trials.

Prerequisite: EPIB650 or SPHL602, and EPIB651; or permission of instructor.

EPIB655 Longitudinal Data Analysis (3 Credits)

Statistical models for drawing scientific inferences from longitudinal data, longitudinal study design, repeated measures and random effects to account for experimental designs that involve correlated responses, handling of missing data.

Prerequisite: EPIB651.

EPIB656 Applied Bayesian Data Analysis (3 Credits)

The theory and practical application of Bayesian statistical methods in the field of public health and related areas. A variety of models will be discussed including linear regression, multilevel model, generalized linear model, generalized linear mixed model.

Prerequisite: EPIB652 or STAT700; or permission of instructor.

EPIB657 Spatial Statistics for Public Health Data (3 Credits)

Overview three main areas of spatial statistics: point patterns, geostatistical data, and lattice (areal) data. Application of spatial statistical models including CSR, k-function, kriging, semivariogram, CAR, SAR, GWR, spatial GLM, and multilevel model to public health and environmental data analysis.

Prerequisite: EPIB651 and EPIB652; or permission of instructor.

EPIB660 Analysis of National Health Survey Data (3 Credits)

Provides background on how features such as stratification, clustering, and unequal sample selection probabilities can invalidate the assumptions underlying traditional statistical techniques, those implicitly assuming a simple random sampling with replacement design. Application using the SURVEY family of SAS/STAT procedures (Version 9.4 or later).

Prerequisite: EPIB650; or permission from Instructor.

Recommended: EPIB697.

EPIB661 Applied Multivariate Data Analysis (3 Credits)

Multivariate analysis targets data with simultaneous measurements on many variables and studies the relationship between these variables.

This course introduces important multivariate analysis methods used in public health research. Topics include multivariate regression analysis, multivariate analysis of variance (MANOVA), principal component analysis (PCA), factor analysis, discriminant analysis (classification), clustering analysis, canonical correlation analysis (CCA) and correspondence analysis (CA).

Prerequisite: Must have completed EPIB651 or permission of instructor.

Recommended: Previous experience with at least one statistical software package (e.g. SAS, R, STATA). SAS is the main software package used for demonstration in class.

EPIB663 SAS Programming (3 Credits)

Learn how to analyze and summarize data using SAS. The course begins by introducing the students to basic SAS programming and data manipulation techniques. More advanced themes, such as preliminary data analysis and graphs, are explored later in the semester. Finally, the class covers the implementation of several advanced statistical concepts in SAS, including T-tests, ANOVA, non-parametric tests, regression and normality tests.

Credit Only Granted for: EPIB698E or EPIB663.

Formerly: EPIB698E.

EPIB664 Missing Data Analysis (3 Credits)

Missing data is a common problem in almost all scientific fields. Students will learn the different patterns and mechanisms of missing data, common procedures to handle missingness including weighting procedure, imputation-based procedure and model-based procedure. Useful and popular imputation methods and tools will be introduced. Numerous real data examples will be included to help students understand and solve the real world problem with missing data for different study designs.

Recommended: Previous experience with at least one statistical software (e.g. SAS, R, STATA).

EPIB670 Molecular Epidemiology of Infectious Diseases (2 Credits)

Molecular epidemiology is a discipline that uses molecular microbiology tools to study the distribution and determinants of diseases in human and animal populations. This course will provide a comprehensive overview and detailed discussion of the core molecular approaches and recent technological advances that are and can be used to investigate the etiology, transmission, and control of infectious diseases in veterinary medicine and public health. Theoretical and practical aspects of various molecular biology methods will be discussed in the context of epidemiological studies of infectious diseases including both bacterial and viral infections of veterinary and zoonotic significance. Lecture topics will cover the principles and application of various molecular techniques to problems of infectious diseases; population and evolutionary genetics of pathogenic microorganisms; data analysis and interpretation. Lecture materials will also be supported with practical data analysis, literature review discussions, which will be student-driven that will critique relevant manuscripts via group discussions in the classroom.

Prerequisite: Students planning to take this course are expected to have had some backgrounds in infectious diseases and molecular biology. Cross-listed with: VMSC670.

EPIB672 Public Health Informatics (3 Credits)

A basic overview of Informatics and its application in a public health setting. The major goal is for students to understand the basic tools and building blocks needed to utilize this technology in order to improve their professional productivity.

Restriction: Instructor permission is required for students not enrolled in a degree seeking program in the School of Public Health. Cross-listed with: HLTH672.

Credit Only Granted for: HLTH670 or HLTH672 or EPIB672.

Formerly: HLTH670.

EPIB689 Advanced Topics in Epidemiology or Biostatistics (1-6 Credits)

Special topics in epidemiology or biostatistics.

Repeatable to: 6 credits if content differs.

EPIB695 Introduction to R for Health Data Analysis (3 Credits)

A hands-on introduction to the statistical package R for health data management and analysis. The first part of the course focuses on basic and essential data manipulation and visualization using R. The second part emphasizes the use of R in statistical analyses, including summarization, correlation, chi-squared test, t-tests, ANOVA, simple and multiple regression. Students will also learn fundamental R language programming to perform user-defined calculations. No previous knowledge of R or of statistical analysis are assumed.

EPIB697 Public Health Data Management (3 Credits)

This course is designed to provide students with the expertise needed to effectively manage research data using SAS as the statistical programming language.

Prerequisite: Permission of instructor.

EPIB698 Special Topics in Epidemiology and Biostatistics (1-3 Credits)

Open to master or doctoral students who desire to pursue special topics in Epidemiology and Biostatistics.

EPIB710 Grantsmanship for Epidemiologic Research (3 Credits)

In-depth study of the knowledge and skills needed to design, conduct, and evaluate an epidemiologic research study. Development of a complete research project.

Prerequisite: EPIB650, EPIB610, EPIB612, EPIB651, and EPIB611.

EPIB740 Advanced Methods in Epidemiology (3 Credits)

In-depth investigation of epidemiologic methods for making causal inferences and solving complex methodological problems. Multivariate models emphasized.

Prerequisite: EPIB650, EPIB610, EPIB612, EPIB651, and EPIB611.

EPIB778 Practical Experience in Public Health (1-4 Credits)

Practice experience providing an opportunity to apply previously acquired knowledge and skills in a health or allied health organization. Setting of the practice experience will depend upon the student's background and career goals.

Prerequisite: Permission of SPHL-Department of Epidemiology and Biostatistics.

Repeatable to: 4 credits.

Credit Only Granted for: EPIB785 or EPIB778.

EPIB786 Capstone Project in Public Health (3 Credits)

Capstone experience providing opportunity to apply knowledge and skills to a specific public health problem or issue. Completion of project relevant to public health under the direction of an advisor.

Prerequisite: Permission of SPHL-Epidemiology & Biostatistics department.

EPIB788 Critical Readings in Epidemiology and Biostatistics (1-3 Credits)

Open to master and doctoral students to discuss critical readings in Epidemiology and Biostatistics.

Prerequisite: Must have completed or be concurrently enrolled in EPIB610.

Repeatable to: 6 credits if content differs.

EPIB798 Independent Study (1-6 Credits)

Master or doctoral students who desire to pursue special research problems under the direction of a faculty member of the department may register for 1-6 hours of credit under this number.

Prerequisite: Permission of SPHL-Epidemiology & Biostatistics department.

Repeatable to: 9 credits if content differs.

EPIB799 Master's Thesis Research (1-6 Credits)**EPIB898 Pre-Candidacy Research (1-8 Credits)****EPIB899 Doctoral Dissertation Research (1-8 Credits)**