EPIDEMIOLOGY, SCM

Master of Science (SCM) Degree Program

Ideal for individuals with strong science and mathematics skills with at least one year of full-time research and/or full-time work experience, the SCM in Epidemiology (https://publichealth.jhu.edu/academics/scm-dept-of-epidemiology/) is a two-year, intensive research degree program that focuses on applying epidemiological and biostatistical methods to a variety of current public health issues. Successful applicants are motivated to use advanced quantitative methods to analyze public health information and to use a translational approach to communicate results. Students select and specialize in one of the research tracks listed below and are expected to complete at least 64 credit units in epidemiology, biostatistics, and elective courses, pass a written comprehensive exam, produce a publishable-quality manuscript based on original research, and present their research during an annual poster symposium. Graduates from the SCM often continue to work in academic research upon graduation and many pursue PhD degrees in a variety of public health arenas after some years of work experience.

Academic Year 2025-26

Due Dates for Summer Conferral (August 22, 2025)

JUNE 6, 2025

- All academic requirements for the degree (except for submission of the thesis) have been fulfilled

JUNE 13, 2025

- Appointment of Thesis Readers form has been submitted to BSPHExams@jhu.edu

AUGUST 22, 2025

- Thesis Acceptance Letters have been submitted to BSPHExams@jhu.edu
- BSPHExams@jhu.edu has received approval of a submitted electronic copy of the dissertation has received from the Sheridan Library

Due Dates for Fall Conferral (December 31, 2025)

OCTOBER 10, 2025

- All academic requirements for the degree (except for submission of the thesis) have been fulfilled

OCTOBER 24, 2025

- Appointment of Thesis Readers form has been submitted to BSPHExams@jhu.edu

DECEMBER 12, 2025

- Thesis Acceptance Letters have been submitted to the BSPHExams@jhu.edu
- BSPHExams@jhu.edu has received approval of the submitted electronic copy of the dissertation has received from the Sheridan Library

Due Dates for Spring Conferral (May 21, 2026)

FEBRUARY 6, 2026

- All academic requirements for the degree (except for submission of the thesis) have been fulfilled

march 13, 2026

- Appointment of Thesis Readers form has been submitted to BSPHExams@jhu.edu

May 1, 2026

- Thesis Acceptance Letters have been submitted to BSPHExams@jhu.edu
- BSPHExams@jhu.edu has received approval of the submitted electronic copy of the dissertation has received from the Sheridan Library

Degree Program Requirements

Course location and modality is found on the BSPH website (https://publichealth.jhu.edu/courses/).

Residency / Registration Requirement

A minimum of 64 credits are required to complete the ScM Degree. The residency requirement is four consecutive terms of at least 16 credits each. Residency must be completed during the first year of the program. The ScM Degree program requires two years of full-time registration to complete the required coursework and thesis.

Non-Class Requirements

Track-Specific Activities Master's

Each Track holds research-in-progress meetings and other activities that Track students are expected to attend. These activities are opportunities to engage and interact with Track faculty, fellow students, and post-doctoral fellows, and to participate and present in the topic area of the Track. All students are expected to participate in their Track. If a student for some reason wishes to switch tracks during the course of their degree, they must schedule a meeting with the Academic Program Manager, Justin Switzer (jswitze4@jhmi.edu), and the director of the intended track to ascertain whether a switch is feasible to still meet graduation requirements in time and to complete a formal form.

Quarterly Master's Meetings

The Program Directors host quarterly meetings with all Masters students. These meetings provide a forum to learn about academic policies and deadlines, for students to raise questions and concerns, and for all to hear the answers. All students are expected to attend quarterly group meetings.

Core Coursework

The core requirements are listed by year and term. To broaden perspective and to enhance the student's capabilities for work in public health or disease-related fields, at least 12 credits of coursework are required in courses from at least one department outside the student's primary department. At least 6 of these credits must be taken in the BSPH. Full-time students register for a minimum of 16 credits and a maximum of 22 credits each term. Masters' degree-seeking students must complete the core requirements for a letter grade earning a B or better in each course. The overall minimum grade point average is 2.75 for master's students.

Cells to Society Courses [CEPH Core Requirements]

A full list of courses and term offerings is located online (https://publichealth.jhu.edu/academics/course-directory/schedule-of-cells-to-society-course-offerings/). Epidemiology degree students are required to complete these 8 of the 12 sessions. Each course is 0.5 credits and is offered only online. Many of these courses can be used as introductions to full-term courses offered in multiple modalities throughout the year.

Code	Title	Credits
PH.552.601	Foundational Principles of Public Health	0.5
PH.552.603	The Role of Qualitative Methods and Science in Describing and Assessing a Population's Health	0.5
PH.552.607	Essentials of Environmental Health	0.5
PH.552.608	Biologic, Genetic and Infectious Bases of Human Disease	0.5
PH.552.609	Psychological and Behavioral Factors That Affect A Population's Health	0.5
PH.552.610	The Social Determinants of Health	0.5
PH.552.611	Globalization and Population Health	0.5
PH.552.612	Essentials of One Health	0.5

Required Core Coursework (*)

Course	Title	Credits
First Year		
First Term		
Summer Before Year 1		
Online Incoming Epi Students 2024 Orientation includes:		
Introduction to Online Learning		
Sexual Harassment and Sexual Violence Prevention Training (Title IX)		
Unconscious Bias Training		
First Term		
PH.140.621 or PH.140.651	Statistical Methods in Public Health I or Methods in Biostatistics I	4
PH.340.751	Epidemiologic Methods 1	5
PH.340.860	Current Topics in Epidemiologic Research	1
Select recommended and elective courses to total 16 credits per term		6
	Credits	**16**
Second Term		
PH.140.622 or PH.140.652	Statistical Methods in Public Health II or Methods in Biostatistics II	4
PH.340.752	Epidemiologic Methods 2	5
PH.340.860	Current Topics in Epidemiologic Research	1
PH.550.865	Public Health Perspectives on Research [1]	2
Select recommended and elective courses to total 16 credits per term		4
	Credits	**16**
Third Term		
PH.140.623	Statistical Methods in Public Health III	4
PH.140.653	Methods in Biostatistics III	4
PH.340.753	Epidemiologic Methods 3	5
PH.340.860	Current Topics in Epidemiologic Research	1
Select recommended and elective courses to total 16 credits per term		2
	Credits	**16**
Fourth Term		
PH.140.624 or PH.140.654	Statistical Methods in Public Health IV or Methods in Biostatistics IV	4
PH.340.723	Epidemiologic Practice Methods for Population Health Research	2
PH.340.820	Thesis Research Epidemiology (varies)	1 - 3
PH.340.860	Current Topics in Epidemiologic Research	1
Select recommended and elective courses to total 16 credits per term		8
Department Comprehensive Examination		
Pass Parts A&B - immediately following Fourth Term		
	Credits	**16-18**
Second Year		
First Term		
PH.340.820	Thesis Research Epidemiology (with thesis adviser, credits variable)	1 - 22
PH.340.860	Current Topics in Epidemiologic Research	1
	Credits	**2-23**
Second Term		
PH.340.820	Thesis Research Epidemiology (with thesis adviser, credits variable)	1 - 22
PH.340.860	Current Topics in Epidemiologic Research	1
	Credits	**2-23**
Third Term		
PH.340.820	Thesis Research Epidemiology (with thesis adviser, credits variable)	1 - 22
PH.340.860	Current Topics in Epidemiologic Research	1
	Credits	**2-23**
Fourth Term		
PH.340.820	Thesis Research Epidemiology (with thesis adviser, credits variable)	1 - 22
PH.340.860	Current Topics in Epidemiologic Research	1
	Credits	**2-23**
	Total Credits	**72-158**

[1] May be waived if student holds MPH from a CEPH accredited program in past 10 yrs

outside of track courses

All students must complete one introductory topical epidemiology course outside of the chosen track. Courses approved by the Curriculum Committee to meet this requirement are listed below:

Code	Title	Credits
Select one of the following:		
FIRST TERM		
PH.340.616	Epidemiology of Aging	
PH.340.731	Principles of Genetic Epidemiology 1	
SECOND TERM		
PH.340.682	Pharmacoepidemiology Methods	
PH.330.603	Psychiatric Epidemiology	
PH.340.624	Etiology, Prevention, and Control of Cancer	
PH.340.627	Epidemiology of Infectious Diseases	
PH.340.645	Introduction to Clinical Trials	
THIRD TERM		
PH.340.699	Epidemiology of Sensory Loss in Aging	
PH.340.607	Introduction to Cardiovascular Disease Epidemiology	

FOURTH TERM		
PH.340.680	Environmental and Occupational Epidemiology	
PH.380.664	Reproductive and Perinatal Epidemiology	
PH.340.666	Foundations of Social Epidemiology	

Track Course Requirements

Each track requires additional coursework as below, and the course content is covered on the annual Comprehensive Exams. Terms and offerings change each year. Always check the Course Directory for the most up-to-date offerings.

Cancer Epidemiology

REQUIRED COURSES

First Year

Code	Title	Credits
FIRST TERM		
PH.340.731	Principles of Genetic Epidemiology 1	4
SECOND TERM		
PH.340.732	Principles of Genetic Epidemiology 2	3
PH.340.624	Etiology, Prevention, and Control of Cancer	4

Second Year

Code	Title	Credits
FIRST TERM		
ME.510.706		2.5
or PH.120.624	Cancer Biology	
SECOND TERM		
ME.510.706		2.5
or PH.180.650	Fundamentals of Clinical Oncology for Public Health Practitioners	
THIRD TERM		
PH.180.640	Molecular Epidemiology and Biomarkers in Public Health	4

Recommended Courses

Code	Title	Credits
FIRST TERM		
PH.340.616	Epidemiology of Aging	3
PH.340.660	Practical Skills in Conducting Research in Clinical Epidemiology and Investigation	3
PH.340.728	Advanced Methods for Design and Analysis of Cohort Studies	5
SECOND TERM		
PH.340.774	Advanced Theory and Methods in Epidemiology	4
PH.140.630	Introduction to Data Management	3
PH.180.650	Fundamentals of Clinical Oncology for Public Health Practitioners	3
PH.330.603	Psychiatric Epidemiology	3
PH.340.645	Introduction to Clinical Trials	3
PH.340.666	Foundations of Social Epidemiology (Alt years offered 4th term)	3
PH.340.682	Pharmacoepidemiology Methods (alternates every other year online (4) and in-person (2))	3
THIRD TERM		
PH.340.606	Methods for Conducting Systematic Reviews and Meta-Analyses	4
PH.340.694	Power and Sample Size for the Design of Epidemiological Studies I	1
FOURTH TERM		
PH.140.632	Introduction to the SAS Statistical Package	3
PH.340.680	Environmental and Occupational Epidemiology	4
PH.120.624	Cancer Biology	3
PH.380.664	Reproductive and Perinatal Epidemiology	4

Cardiovascular and Clinical Epidemiology

Required Courses for Students Focusing on Cardiovascular Epidemiology

First Year

Code	Title	Credits
Students WITHOUT a background in biology or medicine must complete:		
PH.260.621	Introduction to the Biomedical Sciences I (Introduction to the Biomedical Sciences I)	2
PH.260.622	Introduction to the Biomedical Sciences II (Introduction to the Biomedical Sciences II)	2
In addition to the following two courses:		
PH.340.730	Assessment of Clinical Cardiovascular Disease (Alternate years, third term)	2
FIRST TERM		
PH.340.871	Welch Center Research Seminar (Two terms required)	1
SECOND TERM		
PH.340.871	Welch Center Research Seminar (Two terms required)	1
PH.340.645	Introduction to Clinical Trials	3
THIRD TERM		
PH.340.871	Welch Center Research Seminar (Two terms required)	1
PH.340.607	Introduction to Cardiovascular Disease Epidemiology	4
FOURTH TERM		
PH.340.871	Welch Center Research Seminar (Two terms required)	1
PH.340.803	Advanced Topics in Cardiovascular Disease Epidemiology	2

Second Year

Students should consider recommended courses appropriate to augment their knowledge in fields of interest.

required courses for Master's Students Focusing on Clinical Epidemiology

First Year

Code	Title	Credits
Students WITHOUT a background in biology or medicine must complete:		
PH.260.621	Introduction to the Biomedical Sciences I (Introduction to the Biomedical Sciences I)	2
PH.260.622	Introduction to the Biomedical Sciences II (Introduction to the Biomedical Sciences II)	2
FIRST TERM		

PH.340.871	Welch Center Research Seminar (Two terms required)	1
SECOND TERM		
PH.340.871	Welch Center Research Seminar (Two terms required)	1
PH.340.645	Introduction to Clinical Trials	3
PH.340.620	Principles of Clinical Epidemiology	2
THIRD TERM		
PH.340.871	Welch Center Research Seminar (Two terms required)	1
FOURTH TERM		
PH.340.871	Welch Center Research Seminar (Two terms required)	1

Second Year

Students should please consider recommended courses appropriate to augment their knowledge in fields of interest.

recommended Courses for Master's Students in Cardiovascular and Clinical Epidemiology

Code	Title	Credits
FIRST TERM		
PH.340.687	Epidemiology of Kidney Disease	2
PH.340.731	Principles of Genetic Epidemiology 1	4
PH.340.616	Epidemiology of Aging (alternates online and in-person every other year)	3
SECOND TERM		
PH.340.624	Etiology, Prevention, and Control of Cancer	4
PH.340.627	Epidemiology of Infectious Diseases	4
THIRD TERM		
PH.180.640	Molecular Epidemiology and Biomarkers in Public Health	4
PH.340.606	Methods for Conducting Systematic Reviews and Meta-Analyses (usually taken in Year 2)	4
FOURTH TERM		
Skill Courses (can be taken Year 1 or later with commensurate progress in Biostats series)		
PH.340.644	Epidemiology of Diabetes and Obesity	2
PH.340.600	Stata Programming I (Basic) (Term 4)	2
PH.140.632	Introduction to the SAS Statistical Package (Term 4)	3
Advanced Methods Courses (recommended in Year 2, review course catalogue for prerequisites)		
FIRST TERM		
PH.140.641	Survival Analysis	3
PH.140.776	Statistical Computing	3
PH.340.660	Practical Skills in Conducting Research in Clinical Epidemiology and Investigation	3
SECOND TERM		
PH.340.717	Health Survey Research Methods	4
THIRD TERM		
PH.140.655	Analysis of Multilevel and Longitudinal Data	4
PH.140.664	Causal Inference in Medicine and Public Health I	4

recommended Courses for Master's Students with a Focus in Cardiovascular Epidemiology

Code	Title	Credits
FIRST TERM		
PH.140.651	Methods in Biostatistics I	4
SECOND TERM		
PH.140.652	Methods in Biostatistics II	4
PH.340.620	Principles of Clinical Epidemiology	2
THIRD TERM		
PH.140.653	Methods in Biostatistics III	4
FOURTH TERM		
PH.140.654	Methods in Biostatistics IV	4

recommended Courses for Master's Students with a Focus in Clinical Epidemiology

Code	Title	Credits
SECOND TERM		
PH.309.712	Assessing Health Status and Patient Outcomes	3
THIRD TERM		
PH.340.607	Introduction to Cardiovascular Disease Epidemiology	4
PH.340.730	Assessment of Clinical Cardiovascular Disease	2
FOURTH TERM		
PH.340.803	Advanced Topics in Cardiovascular Disease Epidemiology	2

Clinical Trials and Evidence Synthesis

required Courses

First Year

Code	Title	Credits
SECOND TERM		
PH.340.645	Introduction to Clinical Trials	3
THIRD TERM		
PH.340.633	Data Management in Clinical Trials (Completion of 340.606 and 340.633 is required before the end of the program.)	3
or PH.340.606	Methods for Conducting Systematic Reviews and Meta-Analyses	
FOURTH TERM		
PH.340.655	Advanced Methods in Clinical Trials	3

Second Year

Code	Title	Credits
FIRST TERM		
PH.140.655	Analysis of Multilevel and Longitudinal Data	4
THIRD TERM		
PH.340.633	Data Management in Clinical Trials (Completion of 340.606 and 340.633 is required before the end of the program.)	3-4
or PH.340.606	Methods for Conducting Systematic Reviews and Meta-Analyses	

recommended Courses

Code	Title	Credits
FIRST TERM		
PH.140.651	Methods in Biostatistics I	4

PH.221.722	Quality Assurance Management Methods for Developing Countries	4
PH.340.653	Epidemiologic Inference in Outbreak Investigations	3
PH.340.660	Practical Skills in Conducting Research in Clinical Epidemiology and Investigation	3
PH.340.728	Advanced Methods for Design and Analysis of Cohort Studies	5
PH.390.631	Drug Development and Real-World Evidence (RWE)	2
PH.390.673	Emerging Ethical and Regulatory Issues in Clinical Research	3
PH.317.600	Introduction to the Risk Sciences and Public Policy	4
SECOND TERM		
PH.140.630	Introduction to Data Management	3
PH.140.652	Methods in Biostatistics II	4
PH.340.717	Health Survey Research Methods	4
PH.410.710	Concepts in Qualitative Research for Social and Behavioral Sciences	3
THIRD TERM		
PH.140.634	Non-Inferiority and Equivalence Clinical Trials	2
PH.140.642	Design of Clinical Experiments	3
PH.140.653	Methods in Biostatistics III	4
PH.223.664	Design and Conduct of Community Trials	4
PH.340.694	Power and Sample Size for the Design of Epidemiological Studies I	1
PH.340.775	Measurement Theory and Techniques in Epidemiology	4
PH.140.664	Causal Inference in Medicine and Public Health I	4
FOURTH TERM		
PH.140.654	Methods in Biostatistics IV	4
PH.140.632	Introduction to the SAS Statistical Package	3
PH.140.656	Multilevel and Longitudinal Models - Data Analysis Workshop	4
PH.221.616	Ethics and Global Public Health Practice	2
PH.223.705	Good Clinical Practice: A Vaccine Trials Perspective	4
PH.224.691	Qualitative Data Analysis	3
PH.390.675	Outcomes and Effectiveness Research	3
SUMMER INST		
PH.330.621	Mixed Methods for Research in Public Health	2

Environmental Epidemiology

required Courses

First Year

Code	Title	Credits
FOURTH TERM		
PH.182.617	Exposure Sciences for Health Risk Assessment	4
PH.340.680	Environmental and Occupational Epidemiology	4

recommended Courses

Code	Title	Credits
FIRST TERM		
PH.182.615	Airborne Particles	4
PH.187.610	Public Health Toxicology	4
PH.188.680	Fundamentals of Occupational Health	3
PH.317.600	Introduction to the Risk Sciences and Public Policy	4
PH.340.696	Spatial Analysis I: ArcGIS	4
SECOND TERM		
PH.182.625	Principles of Occupational and Environmental Hygiene	4
PH.317.610	Risk Policy, Management and Communication	3
PH.340.624	Etiology, Prevention, and Control of Cancer	4
PH.340.717	Health Survey Research Methods	4
THIRD TERM		
PH.180.601	Environmental Health	5
PH.180.640	Molecular Epidemiology and Biomarkers in Public Health	4
PH.317.605	Methods in Quantitative Risk Assessment	4
THIRD TERM		
PH.140.698	Spatial Analysis III: Spatial Statistics	4
PH.180.625	Community-Driven Epidemiology and Environmental Justice	3
PH.180.647	The Health Effects of Indoor and Outdoor Air Pollution	3
FOURTH TERM		
PH.188.681	Onsite Evaluation of Workplace and Occupational Health Programs	5
PH.317.615	Topics in Risk Assessment	2

Epidemiology of Aging

required Courses

First Year

Code	Title	Credits
FIRST TERM		
PH.340.699	Epidemiology of Sensory Loss in Aging	3
THIRD TERM		
PH.340.699	Epidemiology of Sensory Loss in Aging	3

Recommended Courses

First Year

Code	Title	Credits
EACH TERM		
PH.330.802	Seminar on Aging, Cognition and Neurodegenerative Disorders	2
FIRST TERM		
PH.140.641	Survival Analysis	3
PH.380.604	Life Course Perspectives on Health	4
SECOND TERM		
PH.340.620	Principles of Clinical Epidemiology	2
PH.340.666	Foundations of Social Epidemiology	3
PH.380.603	Demographic Methods for Public Health	4
THIRD TERM		
PH.340.699	Epidemiology of Sensory Loss in Aging	3
PH.260.665	Biological Basis of Aging (offered every other year)	3
FOURTH TERM		
PH.330.623	Brain and Behavior in Mental Disorders	3
PH.140.656	Multilevel and Longitudinal Models - Data Analysis Workshop	4
PH.330.618	Mental Health in Later Life (offered every other year)	2

Second Year

Code	Title	Credits
FIRST TERM		
PH.330.657	Statistics for Psychosocial Research: Measurement	4
PH.340.728	Advanced Methods for Design and Analysis of Cohort Studies	5
SECOND TERM		
PH.140.658	Statistics for Psychosocial Research: Structural Models	4
PH.309.605	Health Issues for Aging Populations	3
THIRD TERM		
PH.140.655	Analysis of Multilevel and Longitudinal Data	4

General Epidemiology and Methodology

required Courses

First Year

Code	Title	Credits
FIRST TERM		
PH.340.731	Principles of Genetic Epidemiology 1 (recommended for year 1 but may be taken in year 2, satisfies the out-of-track requirement as well)	4
SECOND TERM		
PH.340.645	Introduction to Clinical Trials (recommended for year 1 but may be taken in year 2)	3

Second Year

Code	Title	Credits
CHOOSE AT LEAST TWO of these three courses in research skills:		
FIRST TERM		
PH.340.660	Practical Skills in Conducting Research in Clinical Epidemiology and Investigation	3
SECOND TERM		
PH.340.717	Health Survey Research Methods	4
THIRD TERM		
PH.340.648	Clinical Trials Management	3

Pharmacoepidemiology Focus

Code	Title	Credits
FIRST TERM		
PH.317.600	Introduction to the Risk Sciences and Public Policy	4
PH.390.631	Drug Development and Real-World Evidence (RWE)	2
SECOND TERM		
PH.317.610	Risk Policy, Management and Communication	3
THIRD TERM		
PH.140.664	Causal Inference in Medicine and Public Health I	4
PH.340.684	Pharmacoepidemiology: Drug Utilization (alternate year format)	3
PH.221.610	Pharmaceutical Systems: Advancing Access to Medicines in the Field	3
FOURTH TERM		
PH.410.680	Social Ecological Approaches to Health Regimen Adherence in Chronic Conditions	3

recommended Courses

Methodology Focus

Code	Title	Credits
FIRST TERM		
PH.330.657	Statistics for Psychosocial Research: Measurement	4
PH.340.646	Epidemiology and Public Health Impact of HIV and AIDS	4
PH.340.616	Epidemiology of Aging	3
PH.340.653	Epidemiologic Inference in Outbreak Investigations	3
SECOND TERM		
PH.140.658	Statistics for Psychosocial Research: Structural Models	4
PH.183.631	Fundamentals of Human Physiology	4
PH.260.631	Immunology, Infection and Disease	3
PH.330.603	Psychiatric Epidemiology	3
PH.340.620	Principles of Clinical Epidemiology	2
PH.340.624	Etiology, Prevention, and Control of Cancer	4
PH.340.666	Foundations of Social Epidemiology (alternates online and in-person every other year)	3
PH.340.732	Principles of Genetic Epidemiology 2	3
PH.340.641	Healthcare Epidemiology	4
THIRD TERM		
PH.140.640	Statistical Methods for Sample Surveys	3
PH.180.640	Molecular Epidemiology and Biomarkers in Public Health	4
PH.222.647	Nutrition Epidemiology	3
PH.224.690	Qualitative Research Theory and Methods	3
PH.309.616	Introduction to Methods for Health Services Research and Evaluation I	2
PH.340.607	Introduction to Cardiovascular Disease Epidemiology	4
PH.340.609	Concepts and Methods in Infectious Disease Epidemiology	4
PH.340.733	Principles of Genetic Epidemiology 3	3
FOURTH TERM		
PH.140.656	Multilevel and Longitudinal Models - Data Analysis Workshop	4
PH.224.691	Qualitative Data Analysis	3
PH.309.617	Introduction to Methods for Health Services Research and Evaluation II	2
PH.340.677	Infectious Disease Dynamics: Theoretical and Computational Approaches	4
PH.340.680	Environmental and Occupational Epidemiology	4
PH.380.664	Reproductive and Perinatal Epidemiology	4
PH.390.675	Outcomes and Effectiveness Research	3

Second Year Courses

Code	Title	Credits
FIRST TERM		
PH.340.728	Advanced Methods for Design and Analysis of Cohort Studies	5
SECOND TERM		
PH.340.774	Advanced Theory and Methods in Epidemiology	4
THIRD TERM		

PH.140.664	Causal Inference in Medicine and Public Health I	4
PH.140.655	Analysis of Multilevel and Longitudinal Data	4
PH.340.606	Methods for Conducting Systematic Reviews and Meta-Analyses	4

Statistical programming computing courses

Code	Title	Credits
FIRST TERM		
PH.140.776	Statistical Computing	3
SECOND TERM		
PH.140.632	Introduction to the SAS Statistical Package	3
PH.340.600	Stata Programming I (Basic)	2

Pharmacoepidemiology Focus

Code	Title	Credits
FIRST TERM		
PH.317.605	Methods in Quantitative Risk Assessment	4
FOURTH TERM		
PH.317.615	Topics in Risk Assessment	2
The following courses are offered outside of BSPH and require interdivisional registration and instructor permission:		
AS.410.651	Clinical Development of Drugs and Biologics	4
AS.410.627	Translational Biotechnology: From Intellectual Property to Licensing	4
ME.330.809	Analytical Methods of Clinical Pharmacology	1.5

Individualized Focus

Students designing their own educational programs should, in conjunction with their advisor, choose three to four graduate-level courses (taken for a letter grade) in their field from among the offerings of the University in addition to taking the GEM Required courses listed above.

Genetic Epidemiology

required Courses

First Year

Code	Title	Credits
FIRST TERM		
PH.340.731	Principles of Genetic Epidemiology 1	4
SECOND TERM		
PH.340.732	Principles of Genetic Epidemiology 2	3
THIRD TERM		
PH.340.733	Principles of Genetic Epidemiology 3	3

Second Year

Code	Title	Credits
FIRST TERM		
PH.120.602	Concepts of Molecular Biology	4

recommended Courses

Code	Title	Credits
ANALYTIC METHODS COURSES		
FIRST TERM		
PH.140.641	Survival Analysis	3
PH.140.651	Methods in Biostatistics I	4
PH.140.776	Statistical Computing	3
or PH.140.636	Scalable Computational Bioinformatics	
SECOND TERM		
PH.140.638	Analysis of Biological Sequences	3
PH.140.652	Methods in Biostatistics II	4
PH.140.742	Risk Prediction and Precision Medicine (offered every other year)	3
PH.140.778	Statistical Computing, Algorithm, and Software Development	3
PH.340.774	Advanced Theory and Methods in Epidemiology	4
PH.140.777	Statistical Programming Paradigms and Workflows (prerequisite 140.776)	3
THIRD TERM		
PH.140.644	Statistical Machine Learning: Methods, Theory, and Applications	4
PH.140.653	Methods in Biostatistics III	4
PH.140.655	Analysis of Multilevel and Longitudinal Data	4
PH.140.688	Statistics For Genomics	3

Code	Title	Credits
BIOLOGY AND MOLECULAR METHODS COURSES		
FIRST TERM		
PH.260.611	Principles of Immunology I	4
SECOND TERM		
PH.260.612	Principles of Immunology II	3
PH.120.626	Principles of Cell Biology (offered every other year)	3
PH.183.631	Fundamentals of Human Physiology (for non-physician trained students only)	4
THIRD TERM		
PH.180.640	Molecular Epidemiology and Biomarkers in Public Health	4
FOURTH TERM		
PH.120.608	Gene Editing, Therapy and Manipulation	3

Code	Title	Credits
TOPIC-SPECIFIC ELECTIVES		
FIRST TERM		
PH.340.616	Epidemiology of Aging	3
SECOND TERM		
PH.340.624	Etiology, Prevention, and Control of Cancer	4
PH.340.627	Epidemiology of Infectious Diseases	4
THIRD TERM		
PH.340.607	Introduction to Cardiovascular Disease Epidemiology	4
PH.340.775	Measurement Theory and Techniques in Epidemiology	4
PH.330.619	Psychiatric Genomics	3
FOURTH TERM		
PH.415.624	Ethical, Legal and Social Implications in Genetics and Genomics Over Time (offered every other year)	3

Infectious Disease Epidemiology

required Courses

First Year

Code	Title	Credits
FIRST TERM		
PH.340.653	Epidemiologic Inference in Outbreak Investigations	3

SECOND TERM		
PH.340.627	Epidemiology of Infectious Diseases	4
THIRD TERM		
PH.340.609	Concepts and Methods in Infectious Disease Epidemiology	4

Students must complete at least one course in each of the four disciplinary sections below. Additional courses serve as recommended courses.

Section one: General Electives: choose 1

Code	Title	Credits
FIRST TERM		
PH.340.646	Epidemiology and Public Health Impact of HIV and AIDS	4
PH.340.641	Healthcare Epidemiology	4
SECOND TERM		
PH.223.662	Vaccine Development and Application	4
THIRD TERM		
PH.182.640	Food- and Water- Borne Diseases	3
PH.223.663	Infectious Diseases and Child Survival	3
PH.223.687	Vaccine Policy Issues	3
PH.260.656	Malariology	4
PH.340.612	Epidemiologic Basis for Tuberculosis Control	3
FOURTH TERM		
PH.223.682	Clinical and Epidemiologic Aspects of Tropical Diseases	4
PH.223.689	Biologic Basis of Vaccine Development	3
PH.223.705	Good Clinical Practice: A Vaccine Trials Perspective	4
PH.340.651	Emerging Infections	2
PH.380.761	Sexually Transmitted Infections in Public Health Practice	4
PH.380.762	HIV Infection in Women, Children, and Adolescents	4

Section two: Skills in Research: choose 1

Code	Title	Credits
FIRST TERM		
PH.340.660	Practical Skills in Conducting Research in Clinical Epidemiology and Investigation	3
SECOND TERM		
PH.340.717	Health Survey Research Methods	4

Section three: Biology and Pathogenesis of Disease: choose 1

Code	Title	Credits
FIRST TERM		
PH.260.623	Fundamental Virology	4
PH.260.636	Evolution of Infectious Disease	3
PH.340.654	Epidemiology and Natural History of Human Viral Infections	6
THIRD TERM		
PH.260.627	Pathogenesis of Bacterial Infections	4
PH.260.650	Vector Biology and Vector-Borne Diseases	3

Section four: Immunology: choose one set (recommended to complete in year two)

Code	Title	Credits
SET 1 (note: students requesting pass/fail for these two courses only must seek permission from their adviser and the track director)		
FIRST TERM		
PH.260.611	Principles of Immunology I	4
SECOND TERM		
PH.260.612	Principles of Immunology II	3
SET 2		
SECOND TERM		
PH.260.631	Immunology, Infection and Disease	3

Recommended Courses

Code	Title	Credits
PH.340.770	Public Health Surveillance	3
PH.340.769	Professional Epidemiology Methods	4
PH.340.666	Foundations of Social Epidemiology	3

Department Comprehensive Examination

A two-day written departmental comprehensive examination is administered to all students enrolled in Epidemiology degree programs in late May of the first academic year. All students are required to sit for the exam on the scheduled dates—no alternate exams will be offered.

By the time of the examination, students should have completed 64 credits (for four consecutive terms, e.g. one full year of residence), **the required first-year coursework in their Track with a cumulative GPA of at least 2.75,** and in these courses:

	Code	Title	Credits
	PH.340.751	Epidemiologic Methods 1	5
	PH.340.752	Epidemiologic Methods 2	5
	PH.340.753	Epidemiologic Methods 3	5
	Select one of the following Biostatistics series:		16
	PH.140.621 & PH.140.622 & PH.140.623 & PH.140.624	Statistical Methods in Public Health I and Statistical Methods in Public Health II and Statistical Methods in Public Health III and Statistical Methods in Public Health IV	
	PH.140.651 & PH.140.652 & PH.140.653 & PH.140.654	Methods in Biostatistics I and Methods in Biostatistics II and Methods in Biostatistics III and Methods in Biostatistics IV	

The first day of the exam (Part A) includes testing on the following topics:

- Knowledge and application of epidemiologic concepts and methods (and related biostatistics)
- History of epidemiology
- Contemporary issues in public health
- Research ethics

The second day of the exam (Part B) is Track-specific and tests knowledge of concepts and methods presented in the required courses and activities for each Track, as well as the Department core courses as applied to the Track.

Students must pass both Part A and Part B of the comprehensive examination. Master's students must attain at least 70% on both Part

A and Part B to pass. A repeat examination may be allowed but is not guaranteed. If a repeat is granted, it must be completed before starting the second academic year. Failure to pass one or both sections of the comps may result in dismissal from the master's program or from the Department. For additional policies regarding the Comprehensive Exams, please see the next tab.

Master's Thesis (ScM)

Master of Science (ScM) students must complete a thesis based on original research. The readers' committee is comprised of the adviser and one additional University faculty member prior to beginning the thesis project (professor, scientist, lecturer, or instructor of any rank). Upon completion, the thesis is submitted to these two readers for their approval. ScM students planning on a May graduation must adhere to all program deadlines. The School's Policy and Procedures Memorandum (PPM) for the ScM degree program is available here (https://my.jhsph.edu/Resources/PoliciesProcedures/ppm/PolicyProcedureMemoranda/Forms/AllItems.aspx). The thesis is a requirement for partial fulfillment of the ScM degree.

Master's Thesis Expectations

Epidemiology ScM student theses will be evaluated in the following areas by both the faculty thesis adviser(s) and the second reader. In addition, the thesis adviser(s) will evaluate student's quarterly progress detailed in point 5 below.

Each student must register for 4 terms of Thesis Research Epidemiology with their thesis adviser in their second year. The thesis adviser(s), in consultation with the thesis reader, each student will be evaluated on whether their thesis shows:

1. Their understanding of the current state of the knowledge about the public health problem studied for the thesis, as demonstrated by the student's descriptions and discussions of:
   a. The descriptive epidemiology of the public health problem. For example, its prevalence and distribution in the population, and its risk factors (e.g., modifiable, non-modifiable, comorbidities, social, environmental risk factors, etc.).
   b. The biology, physiology, and natural history of the public health problem, if relevant.
   c. The contemporary questions about the public health problem, including new directions in research on the public health problem (including technology, diagnosis, and methodologic challenges).
   d. The impact of the public health problem in the real world, with specific discussions about sub-populations or vulnerable populations that are particularly affected by the problem.
2. The student's ability to integrate and synthesize the current body of literature on the public health problem is demonstrated by:
   a. Preparation of a comprehensive literature review (systematic review, if appropriate see separate document).
   b. Interpretation of findings from multiple research papers and understanding of the full body of research relevant to the public health problem.
   c. Interpretation of the student's own findings within the context of the current body of literature.
   d. Use or evaluation of proper study design, measurement of exposures and/or outcomes, biases, and confounding, biostatistical methods, and application.
   e. Explanation and interpretation of epidemiologic findings for a non-epidemiologist audience.
   f. Identify next steps and future questions that need to be addressed.
   g. Articulation of how the student's findings could be applied in order to affect or diminish the problem at a population (or sub-population) level.
3. The student's ability to prepare a thesis that is:
   a. Logically structured and organized;
   b. Includes figures that illustrate important findings, with proper formatting (e.g. legends, labeled axes, appropriate titles, etc.); and
   c. Includes tables that convey important findings, organized and formatted efficiently (e.g. appropriate titles, headings, footnotes, legends, etc.).
4. The student's ability to write a thesis that is grammatically accurate, including:
   a. Correct punctuation and spelling;
   b. Easily readable by epidemiologists;
   c. Appropriately and adequately referenced citations; and
   d. The student's own original work (please see Plagiarism modules).
5. The student's thesis adviser will evaluate the student on student professionalism, documented by:
   a. Keeping appointments with the thesis adviser and being on time.
   b. Being prepared and organized at each meeting with the thesis adviser, which includes creating and sending an agenda before the meeting.
   c. Demonstrating appropriately paced progress on the thesis research.
   d. Preparing the thesis document.

The expectation is that the student will improve in all aspects of their research during the course of the thesis work and work will show growth across the year culminating in the final thesis.

Master's Poster Session

All Master's students are required to participate in the Master's Poster Symposium held at the end of their second year. Participation is a requirement for partial fulfillment of the ScM degree. Each student should prepare a poster of their thesis work (no other work can be presented,) and have approval of the poster from their adviser(s) before presenting. Although the work done for the poster will represent the Master's student's thesis, the adviser(s), and any other research colleagues, should be included as co-authors. In addition, any funding sources that supported the research directly or indirectly should be cited on the poster (in consultation with thesis adviser(s)). Additional guidelines for the creation of a scientific poster will be disseminated to students at the quarterly Master's meetings. Students are expected to follow these guidelines.

Students should carefully proofread their poster. A poster title and abstract should be submitted to Justin Switzer (jswitze4@jhmi.edu) prior to the Master's Poster Symposium for inclusion in the program.

Attendees at the Master's Poster Symposium include peers, staff, and faculty.

Students who will not graduate in May are still required to present a poster. This poster must be approved by their adviser(s) and presented to the Master's Program Director at least three weeks prior to the date by which the Department must certify student eligibility for award of degree to the School's Office of Records and Registration. Students graduating in August or December must contact the Master's Program Director by

July 1 (August graduation) or November 1 (December graduation) to indicate their plans to graduate and determine a poster presentation date.

The Policy and Procedures Manual for the Master of Science

The Department of Epidemiology reserves the right to augment the PPM (https://my.jhsph.edu/Resources/PoliciesProcedures/ppm/PolicyProcedureMemoranda/Academic_Programs_10_Master_of_Science_Degree_071417.pdf) for BSPH.

Current students can access the Epidemiology Student Handbook on the ScM program page on the BSPH website.

Academic Advising

Students will be assigned an advisor according to their research interests. Students will work with their advisor on a plan for coursework, aim for their research, and thesis. As part of their advising support students will meet regularly with the Epi Academic Core. Students should work with their thesis advisers to develop a timeline for completing their thesis research by the required deadlines. Students are expected to begin thesis research in the summer after their first year.

Advisor/Advisee Manual

Each student in the Department will engage in several advisee roles throughout their program, whether it be as a Teaching Assistant, Graduate Research Assistant Position, or Academic and/or thesis advisee. In accepting any of these roles, the student agrees to abide by the University's Student Conduct Code (https://studentaffairs.jhu.edu/policies-guidelines/student-code/). Faculty, fellows, staff, and students of the School assume a shared obligation to conduct themselves in a manner appropriate to the University's mission as an institution of higher education. The School's Policy and Procedures Memorandum (PPM) for student academic ethics is available on SharePoint (https://my.jhsph.edu/Resources/PoliciesProcedures/ppm/_layouts/15/WopiFrame.aspx?sourcedoc=%7BE347B135-1C7B-462D-9508-004342B633E9%7D&file=Students_01_Academic_Ethics_063018.pdf&action=default). Any mentor/mentee role assumes maintaining the academic integrity of the institution and preserving an environment conducive to the safe pursuit of the School's educational, research, and professional practice missions. Advisor(s) have the responsibility of serving as a guide and mentor. This manual is intended to guide the student and the faculty member(s) in making the Advisor/advisee relationship as successful as possible by:

- Answering questions that students frequently ask
- Providing guidance on how the student and Advisor can interact most effectively

Responsibilities of Advisors include:

- Provide oversight of the student's progress by:
  - Providing a plan, overview, and goals for the role
  - Assisting in the selection of activities, and aiding in skill development
  - Supporting students in meeting milestones
  - Being reasonably available to meet with the student
  - Assessing and developing the student's interests and abilities in the context of the position
  - Referring students to the appropriate individuals or offices that provide academic support and/or resources
- Provide leadership in matters of academic integrity:
  - Being knowledgeable about ethical issues that pertain to academics, research, and practice
  - Helping students interpret and understand institutional policies and procedures regarding the responsible conduct of research
  - Discouraging students from circumventing institutional policies and procedures, and when confronted with such issues, directing students to appropriate institutional resources or contacts, avoiding actual or appearance of conflicts of interest
  - Respecting the confidentiality of students
- Guide and facilitate connection and participation in the greater community (department, school, university, local, state, national, international)

Responsibilities of Advisees include:

- Being an active participant in the role by:
  - Arranging meetings and check-ins
  - Preparing for sessions and adhering to deadlines
  - Identifying and developing professional goals and interests together
  - Understanding policies, guidelines, and procedures as related to the role
- Being a partner in their development by:
  - Asking questions and asking for feedback
  - Working to have positive relationships with the mentor, other members of the team, and/or collaborators
  - Identifying and addressing priorities and learning needs
  - Setting goals for the role

Guidelines for both Advisor and Advisees:

- Communication and Email:
  - Be thoughtful and conducted in a respectful and professional manner and tone.
  - Think critically and carefully if there is disagreement; put forth ideas and disagree respectfully and ask clarifying questions
  - Be respectful of personal time; emails may be sent at any time of the day or night; barring urgency, there is no expectation to read or respond immediately
- Meetings:
  - Establish a regular meeting schedule
  - Use the time wisely and be flexible about scheduling
  - Listen actively and ask questions
  - Use as an opportunity to continue to build trust and rapport
- Conflicts:
  - Resolve respectfully, starting with direct resolution if possible (i.e., the first course of action should be to address the conflict with the individual or individual(s) involved)
  - The Change or Add New Advisor form is available on SharePoint (https://my.publichealth.jhu.edu/sites/EPI/Departmental%20Forms/Forms/Public%20listing.aspx).

Academic Research & Ethics

All students must enroll in PH.550.860 Academic & Research Ethics during the 1st Term of program enrollment at BSPH. The Avoiding Plagiarism at JHU training developed by JHU Sheridan Libraries course

material is contained within the PH.550.860 Academic & Research Ethics at BSPH. This is a self-paced online module and must be completed within the 1st Term of enrollment.

In the course, students are asked to upload two certificates to a CoursePlus DropBox showing completion of both parts of this course:

- Certificate from JHU for the Avoiding Plagiarism module
- Certificate from BSPH for completion of the Responsible Conduct of Research module

Students must also send an electronic copy of the certificates to the Academic Core (BSPH.EpiAcademic@jhu.edu) with their name and "Academic & Research Ethics Requirement" in the subject line of the email.

Responsible Conduct of Research

All students must fulfill the Responsible Conduct of Research requirement. While there is a Responsible Conduct of Research module within the PH.550.860 Academic & Research Ethics at BSPH, this is a separate requirement, and is not fulfilled by the module contained within 550.860.82.

This requirement can be met by completing either of the following two courses:

- PH.550.600 Living Science Ethics - Responsible Conduct of Research
- PH.306.665 Research Ethics and integrity

More resources regarding Responsible Conduct of Research are available on SharePoint (https://my.publichealth.jhu.edu/Offices/Research/rcr_resources/Pages/default.aspx).

Comprehensive Exams

Comprehensive Examination Grading Policy

The Departmental Written Comprehensive Examination is graded by the Department of Epidemiology faculty according to a rubric determined by the Comprehensive Examination Committee. Final results are distributed to students via Course*Plus* by mid-July. Students who wish to view their exam should contact BSPH.EpiAcademic@jhu.edu. (BSPH.EpiAcademic@jhu.edu)

Master's students whose results fall below 70% are allowed to submit a written request for a re-grade of specific questions. Re-grade requests must include a justification for a change in points allocated for each question being contested; requests without appropriate justification will not be considered. Re-grade requests must have the adviser's endorsement who must have reviewed and approved the student's request. Re-grade requests are handled by the faculty on the Comprehensive Examination Committee. Adviser-approved requests can be e-mailed to the current year's Comprehensive Examination Committee Chair and must include a copy to the adviser. For approved requests, a new score will be assigned for each question that is re-graded. This score may be equal to, greater than, or less than, the original score awarded and cannot be contested a second time.

Additionally, ScM students may not commence research until they have successfully passed both part A and part B of the comprehensive examination.

Comprehensive Examination Retake Policy

Students who do not pass the Comprehensive Exam at the appropriate level for their degree program may be granted an opportunity for a retake in August following the May Exam. Students who do not pass the Comprehensive Exam at the appropriate level are not automatically granted a retake. To request a retake, students must submit an official request within two weeks of notification of the not passing grade. This request should include a detailed timeline and study plan, to make the case for passing a retake. This request and plan must be endorsed by and developed with the adviser. Retake requests are reviewed via the Department's Admissions and Credentials Committee. Adviser-approved requests can be e-mailed to the current year's Admissions and Credentials Committee Chairs and must include a copy to the adviser and Senior Academic Program Manager. For approved requests, students are granted one retake only, and it must be in August immediately following the May Exam. A student cannot continue in the degree program without passing the Comprehensive Examination at the appropriate level, prior to the start of the second year.

Recommendations for Special Studies versus Thesis Research

PH.340.840 Special Studies and Research Epidemiology is offered during terms 1, 2, 3, and 4. PH.340.820 Thesis Research Epidemiology is offered terms S, 1, 2, 3, and 4.

Special Studies and Research: PH.340.840.XX

All first-year SCM students should take 1 credit of special studies and research each term during terms 1 -3.

The following list of activities may be approved for independent study or special studies and research and is not inclusive:

- Directed readings and discussions leading up to preparing for the research proposal,
- Literature searches and meta-analyses
- Secondary data analysis,
- Self-guided focused study on a particular methodology or a disease of interest

Thesis Research: PH.340.820.XX

Master's students take PH.340.820 Thesis Research Epidemiology, once they begin working on their research thesis. SCM Students should begin registering for thesis research during the fourth term of the first year once their adviser selection is confirmed. SCM students must take a minimum of 2 credits of thesis research for two terms during their program.

Calculating credits for a variable credit course

- Students must remember that the 1 hour – in class, 2 hours – outside of class ratio still applies: e.g. Students should think about the time the faculty member will be involved in guiding them (see faculty contact hours below) as well as how much time the student uses to conduct outside readings and work.

What constitutes Faculty Contact Hours

- Individual one-on-one meetings
- Faculty revisions of writing projects (faculty members spend a lot of time editing, proofreading, and otherwise providing written feedback to students.)
- Mentoring and networking preparation and discussion.

- Time spent in group settings with faculty mentors e.g. journal clubs or weekly "lab/group" meetings. Students should make every effort to attend the group meetings for their track and adviser.

How to Register

- Students must communicate their intent to register with and receive approval from the faculty mentor in writing, prior to registering for credits for the special studies or thesis research and include the content/activities to be conducted and the number of credits.
- Students may take 1-3 credits while taking a full load of courses.
- Students may take up to 8 credits per term while taking a partial load of courses with the approval of the faculty mentor.
- Students must meet with the faculty mentor before or during add/drop to discuss objectives.

Teaching Assistantships (TAs)

Learning how to be an effective educator and communicator is an integral part of education as an epidemiologist. By serving as a TA, students will be able to:

- Interpret and critique epidemiological studies.
- Interpret epidemiologic data and make valid inferences from study findings.
- Develop skills in articulating epidemiologic concepts and methods
- Communicate effectively in oral and written formats with students, professionals and the public
- Provide epidemiologic critique and advice through advising students and professionals on epidemiologic concepts and methods

Practicing these critical teaching and communications skills prepares students for communicating about epidemiology to diverse audiences in their future careers. The Department recommends that students in the ScM program serve as TAs during their 3rd Term or 4th Term of study, or second year.

TA Trainings

The following TA trainings and activities are designed to give students the skills and tools necessary to be a successful TA. All students are welcome to engage with the trainings and activities at any time:

1. **Departmental TA Training Session**: This student-led training session occurs once per year. Experienced TAs are expected to contribute to this student-led training session in a leadership role.
2. **CTL TA Training**: This self-paced course orients Teaching Assistants to the roles and responsibilities of their position, relevant policies and regulations, technical tools, teaching tips, and other important information. Students submit their CTL Certificate of Completion to the Epi Academic Core.
3. Teaching Academy (https://teachingacademy.jhu.edu/): The Teaching Academy offers graduate students college teacher training and academic career preparation opportunities through courses, workshops, teaching practicums, teaching-as-research fellowships, and individual consultation around the pedagogy of teaching.
4. Teaching Institute (https://teachingacademy.jhu.edu/training/teaching-institute/): The three-day Teaching Institute is an annual training event hosted by the Teaching Academy.

According to the requirements of the Council on Education for Public Health (CEPH), all BSPH degree students must be grounded in foundational public health knowledge. Please view the list of specific CEPH requirements by degree type (https://e-catalogue.jhu.edu/public-health/ceph-requirements/).

Epidemiology (https://publichealth.jhu.edu/departments/epidemiology/) Master of Science Degree Program (https://publichealth.jhu.edu/academics/scm-dept-of-epidemiology/) competencies are designated by track and are charted below. Mastery is achieved by completing the program requirements. (p. 1)

CANCER EPIDEMIOLOGY

1. Identify and distinguish epidemiologic study designs, including the use of population health measures, measures of association, and appropriate analytic models.

2. Discuss core applied statistical concepts and methods, as well as the display and communication of statistical data.

3. Identify the major risk factors for common cancers and effective strategies for cancer prevention and control at the population level.

4. Describe and discuss differences between key types of studies (e.g., linkage and association studies, family-based and population-based studies, direct and indirect association studies) in their application to cancer epidemiology research.

5. Discuss methodological and study design problems in applying biomarkers in epidemiological studies of cancer.

6. Interpret key findings from presentations that cover current topics in modern cancer epidemiology.

CARDIOVASCULAR AND CLINICAL EPIDEMIOLOGY

1. Identify and distinguish epidemiologic study designs, including the use of population health measures, measures of association, and appropriate analytic models.

2. Discuss core applied statistical concepts and methods, as well as the display and communication of statistical data.

3. Describe the symptoms and risk factors for cardiovascular (and other major chronic) diseases; pathophysiologic processes and biological mechanisms involved in those diseases; and techniques (e.g., echocardiography, CT scan, and MRI) used to detect and quantify the presence of those diseases.

4. Describe study designs (cohort, case-control, clinical trials, meta-analyses) and data sources (observational, experimental, routinely collected clinical and administrative data) that are used to study cardiovascular and major chronic diseases. Discuss the advantages and disadvantages of these study designs and data sources with respect to clinical and cardiovascular disease epidemiology.

5. Discuss the societal and public health impact of cardiovascular and major chronic diseases. Identify treatment strategies, disease management options, and strategies for primary and secondary prevention of cardiovascular and major chronic diseases.

6. Interpret key findings from presentations that cover current topics in modern cardiovascular disease epidemiology.

CLINICAL TRIALS AND EVIDENCE SYNTHESIS

1. Identify and distinguish epidemiologic study designs, including the use of population health measures, measures of association, and appropriate analytic models.

2. Discuss core applied statistical concepts and methods, as well as the display and communication of statistical data.

3. Assess methods for the design, conduct, and analysis of randomized controlled trials. Assess methods for synthesizing evidence using epidemiological tools such as systematic reviews, meta-analysis, and network meta-analysis.

4. Describe the practical skills required to coordinate/manage a multicenter clinical trial such as writing effective study materials and recruitment and retention of participants. Identify key trial documents including the protocol, manual of procedures/handbook, performance monitoring reports, and adverse event reports.

5. Apply the principles of the acquisition, management, and distribution of data in clinical trials. Evaluate alternative courses of action and policies regarding data collection and management issues in a trial.

6. Interpret key findings from presentations that cover current topics in clinical trials and epidemiological methods.

ENVIRONMENTAL EPIDEMIOLOGY

1. Identify and distinguish epidemiologic study designs, including the use of population health measures, measures of association, and appropriate analytic models.

2. Discuss core applied statistical concepts and methods, as well as the display and communication of statistical data.

3. Recognize the epidemiology of diseases associated with environmental, industrial, and occupational exposures.

4. Develop basic assessment strategies for environmental and occupational exposures.

5. Identify risk assessment principles in studies of occupational and environmental epidemiology.

6. Interpret key findings from presentations that cover current topics in modern environmental epidemiology.

EPIDEMIOLOGY OF AGING

1. Identify and distinguish epidemiologic study designs, including the use of population health measures, measures of association, and appropriate analytic models.

2. Discuss core applied statistical concepts and methods, as well as the display and communication of statistical data.

3. Describe the public health significance of an aging population.

4. Describe and synthesize the epidemiology of major adverse outcomes in older adults not only restricted to incident diseases and mortality, but also including geriatric syndromes (e.g., frailty, falls, sensory loss), and functional outcomes (e.g., physical disability, cognitive impairment, and sensory impairment).

5. Identify the epidemiologic implications of key health-related aging concepts, including heterogeneity of health status, comorbidity burden, subclinical disease, compression of morbidity, disability, and frailty.

6. Interpret key findings from presentations that cover current topics in modern epidemiology of aging.

GENERAL EPIDEMIOLOGY AND METHODS

1. Identify and distinguish epidemiologic study designs, including the use of population health measures, measures of association, and appropriate analytic models.

2. Discuss core applied statistical concepts and methods, as well as the display and communication of statistical data.

3. Design, organize, analyze, and interpret observational and experimental studies. Interpret the effects of complex mechanisms involving bias and variability.

4. Delineate the influences of social processes on the etiology and course of common diseases by constructing a framework that underscores the roles of key social conditions on the health and illness of populations.

5. Interpret and describe advanced design methods applied to epidemiologic research.

6. Interpret key findings from presentations that cover current topics in modern epidemiology methodology.

GENETIC EPIDEMIOLOGY

1. Identify and distinguish epidemiologic study designs, including the use of population health measures, measures of association, and appropriate analytic models.

2. Discuss core applied statistical concepts and methods, as well as the display and communication of statistical data.

3. Demonstrate and apply key components and concepts of human molecular biology and genetics.

4. Design, implement, and interpret genetic epidemiology studies.

5. Write computer scripts and utilize statistical and genomic software to carry out genomic analyses.

6. Interpret key findings from presentations that cover current topics in modern genetic epidemiology.

INFECTIOUS DISEASE EPIDEMIOLOGY

1. Identify and distinguish epidemiologic study designs, including the use of population health measures, measures of association, and appropriate analytic models.

2. Discuss core applied statistical concepts and methods, as well as the display and communication of statistical data.

3. Describe the taxonomy of infectious agents and their distinguishing microbiological features.

4. Define and calculate basic concepts to describe the natural history of infectious diseases.

5. Identify strategies such as surveillance and contact tracing for infection control and outbreak control.

6. Interpret key findings from presentations that cover current topics in modern infectious disease epidemiology.