

# EPIDEMIOLOGY – M.P.H.

## Program director

Alan Cupino

The M.P.H. degree in epidemiology is designed to give theoretical and practical training in how to study and control factors that influence health-related problems. This degree prepares students to work in federal, state, and local health departments/agencies, academic and research institutions, health maintenance organizations, and health systems.

Coursework for the epidemiology program may be pursued in the following formats:

- A traditional, on-campus program (combination of on-campus and online coursework)
- An online program (combination of synchronous and asynchronous coursework)

## Program learning outcomes

By the end of the program, graduates should be able to:

1. Evaluate epidemiology study design.
2. Analyze epidemiologic data using intermediate level statistical methods and software.
3. Report epidemiologic research results through oral and written reports.
4. Critically review epidemiologic literature.
5. Interpret epidemiologic findings to characterize the health of populations.

## Educational effectiveness indicators

Program learning outcomes as evidenced by:

- Signature assignments linked to course and non-course requirements
- Field practicum report
- Culminating experience (<http://llucatalog.llu.edu/public-health/masters-degrees/#mphtext>)

## Prerequisite

In addition to the entrance requirements for all M.P.H. degrees (<http://llucatalog.llu.edu/public-health/masters-degrees/#admissionstext>), applicants to the M.P.H. degree program in epidemiology must have taken:

- College algebra or equivalent (calculus preferred)
- At least two college-level courses in any of the following:
  - Biological sciences
  - Public health
  - Health sciences

## Program requirements

### Public health core

PCOR 501	Public Health for Community Resilience	5
PCOR 502	Public Health for a Healthy Lifestyle <sup>1</sup>	5
PCOR 503	Public Health and Health Systems	5

### Major

EPDM 509	Principles of Epidemiology	3
EPDM 510	Epidemiologic Methods I	3
EPDM 511	Epidemiologic Methods II	3
EPDM 520	Data Collection Methods	3
EPDM 530	Disease Distributions and Determinants I	3
EPDM 531	Disease Distributions and Determinants II	3
STAT 515	Grant- and Contract-Proposal Writing	3
STAT 521	Biostatistics I	3
STAT 522	Biostatistics II	3
STAT 548	Analytical Applications of SAS and R	2

### Religion

RELE 534	Ethical Issues in Public Health	3
----------	---------------------------------	---

### Cognates/Electives

Choose in consultation with advisor		6
-------------------------------------	--	---

### Research project

EPDM 699A	Applied Research	1
-----------	------------------	---

**Total Units** **54**

### Applied practice experience

**3**

Practicum units are in addition to the minimum didactic units required for the degree

PRAC 704	Public Health Practicum I	1-3
or PRAC 705A	Public Health Practicum II	
or PRAC 705B	Public Health Practicum II	
or PRAC 705C	Public Health Practicum II	

<sup>1</sup> Fulfills service learning requirement

## EPDM/STAT forums

During their program, students are required to attend a minimum of twelve forums in epidemiology, biostatistics, and/or in the Adventist Health Study.

## Integrative learning experience

To fulfill standard integrative learning experience requirements (<https://llucatalog.llu.edu/public-health/masters-degrees/#mphtext>) students in the Epidemiology MPH program will be required to deliver an oral presentation and prepare a manuscript.

## Normal time to complete the program

1.5 years (six [6] academic quarters) – based on full-time enrollment; part time permitted

## Courses

### EPDM 509. Principles of Epidemiology. 3 Units.

Outlines principles and methods used to investigate distribution, determinants, and disease prevention strategies. Includes: measures of disease frequency, effect, and potential impact; comparison and contrast of study designs; methods to identify and control confounding; methods to improve validity, information, and selection bias; and, methods to assess causation, evaluate statistical significance, evaluate screening for latent disease, and interpret results. Prerequisite or concurrent: STAT 521; or consent of instructor.

**EPDM 510. Epidemiologic Methods I. 3 Units.**

An intermediate-level course on epidemiologic concepts and methods. Topics include causation, measures of disease occurrence, measures of effect, study design, types of bias, assessment and correction for bias, confounding, and interaction. Prerequisite: EPDM 509; STAT 521; or consent of instructor.

**EPDM 511. Epidemiologic Methods II. 3 Units.**

Second course in the epidemiologic methods sequence. Advanced study designs and multivariable modeling of exposure-disease relationships. Includes: hybrid and incomplete designs; the model-building approach; generalized linear and multi-variate models; and, maximum likelihood theory. Prerequisite: EPDM 510; STAT 522; or consent of instructor.

**EPDM 512. Epidemiologic Methods III. 3 Units.**

Expands coverage of generalized linear models and time-to-event models. Covers contemporary advancements in epidemiologic methods in the analysis of observational data. Exercises focus on data analysis and written reports. Prerequisite: EPDM 511; STAT 522; or consent of instructor.

**EPDM 515. Clinical Trials. 3 Units.**

Theory and practice of intervention studies, including community and clinical trials. Course includes components of a trial protocol, different types of trial design, analysis methods, and ethical considerations. Prerequisite: EPDM 509; STAT 509 or STAT 521.

**EPDM 520. Data Collection Methods. 3 Units.**

An overview of the principles and procedures of data collection as applied to the health sciences. Topics covered include: research designs; different research techniques (quantitative, qualitative, and mixed methods); modes of data collection; sampling methods; questionnaire development; sources of error in data collection; and ethical research. Students develop a data-collection instrument and perform data collection from initial conceptualization of the research topic.

**EPDM 525. Special Topics in Epidemiology. 1-4 Units.**

Lecture and discussion on a current topic in epidemiology. May be repeated for a maximum of 4 units applicable to degree program. Prerequisite or concurrent: EPDM 509.

**EPDM 530. Disease Distributions and Determinants I. 3 Units.**

First of a two-course sequence on the distributions of common diseases and their determinants. Covers the epidemiology of cardiovascular disease, diabetes, obesity, and related risk factors that include nutritional and social epidemiology. Prerequisite: EPDM 509; or consent of instructor.

**EPDM 531. Disease Distributions and Determinants II. 3 Units.**

Second of a two-course sequence on the distributions of common diseases and their determinants. Covers the epidemiology of cancer, genetic and molecular epidemiology, environmental epidemiology, and related risk factors. Includes special topics. Prerequisite: EPDM 509; or consent of instructor.

**EPDM 544. Epidemiology of Infectious Disease. 3 Units.**

Applies epidemiologic concepts, methods, and principles to infectious diseases of public health significance. Addresses “old,” changing, and emerging diseases. Discusses the role of surveillance systems in infection control and the potential of developing appropriate public health interventions within the context of prevention, control, and eradication programs. Prerequisite or concurrent: EPDM 509.

**EPDM 555. Epidemiologic Methods in Outcomes Research and Continuous Quality Improvement. 3 Units.**

Epidemiologic methods of outcomes research and continuous quality improvement techniques in medical care processes. Includes: medical care as a process; use of control charts in process improvement; measurement of quality of care; and, patient satisfaction. Addresses cost benefit, cost effectiveness, cost utility, and decision-tree analysis applied to medical care and public health. Prerequisite: EPDM 509 or EPDM 510.

**EPDM 567. Epidemiology of Aging. 3 Units.**

Presents global demographic trends, determinants, and measures of population-age structure. Includes: health, morbidity, disability, and mortality; mechanisms, biomarkers, and genetics of aging; chronic disease risk factors and prevention; research and clinical trials; ethics; economics; and, drug use. Prerequisite or concurrent: EPDM 509 or EPDM 510; STAT 509 or STAT 521.

**EPDM 588. Environmental and Occupational Epidemiology. 3 Units.**

Evaluates principles and approaches used in the assessment of environmental exposure; selection of applicable study designs; and, determination of analytic methods used in the investigation of environmental health problems. Epidemiologic analysis of selected and controversial environmental exposures that impact public health practice, disease morbidity, and mortality outcomes. Prerequisite: EPDM 509 or EPDM 510; STAT 509 or STAT 521.

**EPDM 610. Advanced Epidemiologic Methods. 4 Units.**

Provides in depth training in study designs and multivariable modeling of exposure-disease relationships. Uses model-building approaches, including causal diagrams, methods of variable selection and specification, confounding, interaction, and trend testing. Focuses on survival analysis concepts. Prerequisite: EPDM 509; EPDM 510; STAT 521; STAT 522; STAT 548.

**EPDM 611. Epidemiologic Methods. 3 Units.**

This course introduces multivariable modeling of exposure-disease relationships. Topics include an introduction to generalized linear models (emphasizing linear, logistic, and Poisson) and survival analysis concepts. Exercises focus on problem sets, data analysis, and written and oral reports. Prerequisite: EPDM 510; STAT 522; or consent of instructor.

**EPDM 614A. Advanced Epidemiological Methods I. 2 Units.**

Covers advanced epidemiologic methods—e.g., modeling longitudinal, time to event and count data, complex survey methods, meta-analysis, and other methods for dealing with confounding, selection bias, and measurement error. Focuses exercises on analysis, interpretation, and written reports. First in a two-course sequence.

**EPDM 614B. Advanced Epidemiological Methods II. 2 Units.**

Covers advanced epidemiologic methods—e.g., modeling longitudinal, time to event and count data, complex survey methods, meta-analysis, and other methods for dealing with confounding, selection bias, and measurement error. Focuses exercises on analysis, interpretation, and written reports. Second in a two-course sequence. Prerequisite: EPDM 614A.

**EPDM 618. Field Epidemiology and Surveillance. 2 Units.**

Covers steps in conducting epidemiological field investigations, developing interventions, and communicating findings. Provides experience with epidemiological methods and analyses for public health surveillance, including syndromic surveillance and surveillance of public health events/outbreaks as well as setup and evaluation of surveillance systems. Requires conducting advanced statistical analysis of surveillance data and use of various methods for communicating findings.

**EPDM 625. Advanced Topics in Epidemiology. 2 Units.**

Studies selected advanced epidemiological topics. Includes critical review of epidemiological evidence relating to risk factors and etiology as well as prevention and intervention strategies. Highlights future research opportunities. Specific content varies by quarter. May be repeated for additional credit.

**EPDM 635. Epidemiological Studies of Adventists. 1 Unit.**

Reviews and critically evaluates the epidemiological research conducted in Seventh-day Adventist populations. Examines the history, rationale, methods, findings, and scientific contributions of this research. Prerequisite: EPDM 509.

**EPDM 645. Epidemiology of Tobacco Use and Control. 2 Units.**

An epidemiological overview of the tobacco pandemic—global/national tobacco trends, socioeconomic impact, prevention/control issues, and multisectoral strategies. Describes tobacco's "hidden" burden relative to infectious diseases and adverse maternal-infant outcomes. Introduces basic tools to measure tobacco use, monitor tobacco policy implementation, conduct surveillance/evaluation of global/local tobacco control programs. Facilitates participation in ongoing field-based projects.

**EPDM 664. Epidemiology of Cardiovascular Disease. 2 Units.**

Examines both the descriptive and etiologic epidemiology of the major cardiovascular diseases, including hypertension, ischemic heart disease, congestive heart failure, and stroke. Covers the experimental designs and analytic techniques commonly used in cardiovascular epidemiology. Critically reviews the experimental and epidemiological evidence relating risk factors for cardiovascular diseases. Reviews the design and results of major cardiovascular disease intervention studies. Prerequisite: EPDM 509.

**EPDM 665. Epidemiology of Cancer. 2 Units.**

Examines both the descriptive and etiologic epidemiology of cancer. Examines recent statistics and historic trends for disease burden, incidence, survival, and mortality in the US and globally. Critically reviews the literature on the etiology, risk factors, and prevention of particular high-incidence/mortality cancers, with an emphasis on the role of lifestyle factors (tobacco, alcohol, diet, physical activity, and obesity). Prerequisite: EPDM 509.

**EPDM 668. Molecular Epidemiology. 2 Units.**

Provides an overview of basic concepts of molecular epidemiology, with a focus on applications of biomarkers in epidemiology. Covers technologies, tools, and design considerations for epidemiologic studies involving biomedical data. Includes a survey of standard techniques for statistical analysis in molecular epidemiology. Prerequisite: EPDM 509.

**EPDM 680. Advanced Epidemiology Seminar. 1 Unit.**

Covers critical reading of epidemiological reports. Requires identification of peer-reviewed and published journal articles relating to cutting-edge research, critiquing them with focus on a range of aspects (i.e., study design, statistical methods, and layout of findings), and presenting critiques for discussion.

**EPDM 685. Preliminary Research Experience. 1,2 Unit.**

Experience gained in various aspects of research under the guidance of a faculty member and by participation in an ongoing project. Must be completed prior to beginning dissertation research project. Limited to doctoral degree students.

**EPDM 694. Research. 1-14 Units.**

Independent epidemiologic research program arranged with faculty member(s) involved. Written report and oral presentation required. Prerequisite: Consent of instructor responsible for supervision and of academic advisor.

**EPDM 697. Dissertation Proposal. 1-10 Units.**

Student develops the written dissertation proposal. Doctoral dissertation committee chairman works with the student on mutually agreed-upon objectives. Evaluation based on the accomplishment of these objectives. Culminates in a written and oral dissertation proposal defense and advancement to candidacy. Doctoral students only. Successful completion of comprehensive exams.

**EPDM 698. Dissertation. 1-14 Units.**

Based on the doctoral research study, student writes a dissertation in submitted-paper format, submits the individual manuscripts to scientific journals, and responds to reviewers' comments. Prerequisite: EPDM 697 and advancement to candidacy.

**EPDM 699A. Applied Research. 1 Unit.**

Independent epidemiologic research. Research program arranged with faculty member(s) involved. Written report and oral presentation required.

**EPDM 699B. Applied Research. 1 Unit.**

Independent epidemiologic research. Research program arranged with faculty member(s) involved. Written report and oral presentation required.

**EPDM 699C. Applied Research. 1 Unit.**

Independent epidemiologic research. Research program arranged with faculty member(s) involved. Written report and oral presentation required.

**EPDM 699D. Applied Research. 1 Unit.**

Independent epidemiologic research. Research program arranged with faculty member(s) involved. Written report and oral presentation required.