EPIDEMIOLOGY CONCENTRATION

The Doctor of Public Health (Dr.P.H.) degree with a concentration in epidemiology is an advanced professional degree program. It is designed to prepare epidemiologists to provide leadership in both the study of disease occurrence patterns and risk factors in defined populations and in the practice of epidemiology throughout county, state, national and international settings. It prepares graduates to serve in diverse sectors including local and state public health departments, hospitals and health-care systems, health-care payers and insurers, pharmaceutical and other health-care companies, public health nonprofit companies, and schools and programs of public health. Didactic courses and an advanced practicum provide training in the skills and expertise important to advance public health professional development in the field of epidemiology. Additionally, the program is designed to promote epidemiological leadership that will thrive in the ever-changing landscape of public health.

Program Learning Outcomes

Upon completion of the program, graduates should be able to:

1. Design appropriate studies or epidemiologic investigations to answer important health related questions about disease or health distribution or determinants.
2. Analyze complex data using appropriate statistical methods and computer software resources to answer epidemiological questions.
3. Interpret public health information from epidemiologic field investigations and propose recommendations for control and prevention.
4. Effectively communicate epidemiologic science to the scientific community and the public, to advance the field and to promote public health.
5. Critically review and interpret public health and other scientific literature in a public health area, identify gaps in evidence and propose further epidemiologic investigation.

Educational Effectiveness Indicators

- Comprehensive examination (epidemiology concentration specific)
- One publishable research paper submitted for publication to peer reviewed scientific journal
- Doctoral project presentation

Prerequisites

In addition to the entrance requirements for all Dr.P.H. degrees (http://llucatalog.llu.edu/public-health/doctoral-degrees/#admissionstext), each applicant to the epidemiology concentration must have:

- M.P.H. degree in epidemiology or biostatistics or comparable master's degree in a related field (e.g., statistics, data science)
- OR M.P.H. nonepidemiology/biostatistics concentration or equivalent degree and the following or equivalent courses:
  - EPDM 509 Principles of Epidemiology or equivalent
  - EPDM 510 Epidemiologic Methods I or equivalent
  - STAT 521 Biostatistics I or equivalent
  - STAT 548 Analytical Applications of SAS and R or equivalent
  - One year of biological sciences

Concentration requirements

Corequisites

See standard DrPH corequisites (http://llucatalog.llu.edu/public-health/doctoral-degrees/drph/) in addition to the course listed below:

EPDM 511	Epidemiologic Methods II	3

Degree requirements

Dr.P.H. public health core

Critical analysis		
EPDM 512	Epidemiologic Methods III	3
PHCJ 600	Overview of Research Methodologies	3
STAT 522	Biostatistics II	4
Leadership, management, and governance		
PHCJ 607	Professional Leadership	3
PHCJ 616	Administrative Systems in Agency Management	3
PHCJ 617	Building Healthy Systems	3
Education and workforce development		
PHCJ 614	Pedagogy: The Art and Science of Teaching	2
PHCJ 618	Transformative Communication	2
Policy, advocacy and programs		
PHCJ 609	Building Healthy Individuals	3
PHCJ 610	Building Healthy Communities [1]	3
Doctoral seminar		
PHCJ 608A	Doctoral Seminar for Public Health	1
PHCJ 608B	Doctoral Seminar for Public Health	1
PHCJ 608C	Doctoral Seminar for Public Health	1
Epidemiology core		
EPDM 614A	Advanced Epidemiological Methods I	2
EPDM 614B	Advanced Epidemiological Methods II	2
EPDM 618	Field Epidemiology and Surveillance	2
EPDM 625	Advanced Topics in Epidemiology [2]	6
EPDM 680	Advanced Epidemiology Seminar [2]	3
Electives		**2-6**
Choose from the following:		
EPDM 520	Data Collection Methods	
EPDM 544	Epidemiology of Infectious Disease	
HGIS 535	Integration of Geospatial Data in GIS	
NUTR 634	Concepts of Nutritional Epidemiology	
Religion		
RELE 5__	Graduate-level ethics	3
RELR 5__	Graduate-level relational	3
RELT 5__	Graduate-level theological	3
Integrated learning experience		
PHCJ 698	Doctoral Project	4
Total Units		**62-66**

Practicum		
Practicum units are in addition to the minimum didactic units required for the degree		
PHCJ 795	Applied Practice	2

1 Fulfills service learning requirement
2 Requires multiple registrations to fulfill total unit requirement.

Applied practice experience and integrated learning experience

All Dr.P.H. students will engage in an applied practice experience that results in a product that is relevant to public health organizations. The culminating activity is an integrated learning experience that includes a field-based project emphasizing advanced practice. Both applied practice experience and integrated learning experience will demonstrate integration of foundational and concentration specific competencies.

Normal time to complete the program

Three (3) years — 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 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 Cardiovasular 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.