

EPIDEMIOLOGY (MS)

Master of Science in Epidemiology

Unit: School of Public Health and Information Sciences (<https://louisville.edu/sphis/>) (GH)

Department: Epidemiology and Population Health (<https://louisville.edu/sphis/departments/eph/>)

Program Website (<https://louisville.edu/sphis/departments/eph/academics/>)

Academic Plan Code(s): EPIDMSE

Program Information

The Master of Science (MS) in Epidemiology program is designed to prepare students for the PhD program in Public Health Sciences with a concentration in Epidemiology. The MS in Epidemiology is offered by the Department of Epidemiology and Population Health.

Competencies

To graduate, students in the MS program in epidemiology must maintain a GPA of 3.0 or higher and be able to demonstrate the following competencies:

- Explain the evolving paradigms of epidemiologic theory and study design and their impact on public health and medical sciences
- Summarize scientific literature on an epidemiologic problem
- Formulate epidemiologic research questions and testable hypotheses
- Apply computer software for data management and analysis
- Design and apply methods for data collection and management for epidemiologic research
- Apply advanced quantitative methods to analyze an epidemiologic problem
- Integrate cross-disciplinary knowledge from molecular to population levels to make appropriate causal inferences
- Communicate in written and oral presentations epidemiologic concepts and findings to diverse audiences

In greater detail, an MS student must specifically demonstrate:

- Mastery of the principles of epidemiologic, observational study design, including:
 - The merits and limitations of cross-sectional, retrospective and prospective designs
 - Methods of disease surveillance and case ascertainment
 - Methods of population-based sampling
 - Sample size and statistical power calculation
 - Issues in the measurement of exposure and disease transmission
 - Identification and correct interpretation of potential biases in study design
- Knowledge of the socioeconomic and geographic distribution, risk factors, and etiology of major acute, infectious and chronic morbidity and mortality.
- Mastery of basic methods of analysis of epidemiologic data, including:
 - Measures of disease frequency, prevalence and incidence
 - Methods for adjusting rates for age, gender, etc.
 - Measures of association, odds ratio, relative risk
 - Control of confounding and effect modification through stratification and statistical control

- Modeling in multiple logistic regression
- Principles of survival analysis
- Correct interpretation of results with regard to issues of error, bias and criteria for causality

These competencies are demonstrated through the successful completion of the coursework and the design, execution, documentation, and presentation of the research for the student's thesis.

Curriculum

The program is designed as a two-year program of coursework and thesis research and preparation. The student is expected to develop and plan his or her thesis research prior to the final semester in which the majority of the actual research is done.

Faculty Advisor

Upon admission to the MS program, each student is assigned a faculty advisor by the department chair or program director. Students and/or advisors who wish to change their assigned relationship must make a written request to the department chair or program director.

The student and his or her faculty advisor work together to develop a program of study that recognizes the student's research interests and core elements of modern epidemiology and its breadth and multidisciplinary nature.

Admission Requirements

Students with a prior baccalaureate degree, or an advanced degree in an appropriate field of study, from a regionally accredited university or college are eligible for the MS program in Epidemiology.

Previous coursework in mathematics and/or statistics and biological or health sciences (for example, biology, biochemistry, anatomy, physiology, and/or microbiology) is strongly recommended. Applicants who are judged to not have sufficient prior coursework or experience in these areas may be required to take additional coursework.

The following are required for admission:

- Formal application through the Graduate School (<https://louisville.edu/graduate/futurestudents/apply-materials/application/>) with transcripts and curriculum vitae,
- A one-page personal statement describing the applicant's background and interest in epidemiology,
- Two letters of recommendation,
- Undergraduate GPA at least 3.0 on 4.0 scale,
- International students for whom English is not their primary language must show English language proficiency by one of the following:
 - International students for whom English is not their primary language must show English language proficiency by one of the following:
 - TOEFL examination score at or above a 5.0 on the TWE test), 213 (computer based test) or 79 (internet based test)
 - IELTS test score of 6.5 or higher
 - [Duolingo test score of 105 or higher](#)
 - ECFMG (Educational Commission for Foreign Medical Graduates) certification
 - Successfully passing the exit examination for the advanced level of an Intensive English as a Second Language Program

- Demonstration of a degree awarded from an institution with instruction primarily in English, as formally documented by an appropriate institutional official

Application Deadline

Fall semester - March 1 (International applicants); April 1 (Domestic applicants).

Spring semester - Applications are not accepted.

Summer semester – Applications are not accepted.

Program Requirements

Degree requirements include required coursework in epidemiology, elective coursework in biostatistics and in public health sciences, and a thesis.

38 total credit hours:

- 20 credit hours of required coursework
- 12 credit hours of elective coursework
- 6 credit hours of thesis research

Year 1		
Fall		Hours
PHEP 621	Statistical Foundations for Epidemiology	4
PHEP 622	Population Pathology	3
PHEP 623	Theoretical Foundations of Epidemiology	3
Hours		10
Spring		
Content Course Elective ¹		3
Public Health Selective ²		3
PHEP 618	Epidemiologic Methods II	4
Hours		10
Summer		
PHEP 666	Master's Independent Study in Epidemiology and Population Health (optional) ³	1-3
Hours		3
Year 2		
Fall		
PHEP 701	Advanced Epidemiologic Methods	3
PHEP 702	Epidemiologic Research Management	3
Content Course Elective ¹		3
Hours		9
Spring		
Content Course elective ¹		3
PHEP 666	Master's Independent Study in Epidemiology and Population Health ³	1-3
Hours		6
Minimum Total Hours		38

¹ PHEP-xxx *Content Course Electives* consist of courses specialized in either an exposure or disease category and offerings will vary from semester to semester based upon faculty workloads. In the MS program these courses will emphasize (*if not be restricted to*):

- PHEP 607 Epidemiology of Cancer
- PHEP 611 Nutritional Epidemiology
- PHEP 613 Epidemiology of Aging and Disability
- PHEP 615 Foundations of Global Maternal and Child Health
- PHEP 620 Environmental and Occupational Epidemiology
- PHEP 624 Methods in Reproductive and Perinatal Epidemiology

- PHEP 625 Child Health & Development
- PHEP 626 Introduction to Social Epidemiology

² PHxx *Public Health Selective* may be a PHEP offering or an offering from another SPHIS department: students will have to rationalize their selection with respect to their program of study which must be approved by the Program Director.

³ PHEP 666 Master's Independent Study in Epidemiology and Population Health is an independent study course in which an MS student can *research and develop a thesis idea*. A total of six (6) credit hours of enrollment in PHEP 666 is required. Students may elect to take three (3) credit hours in the summer and three (3) credit hours in the Spring II semester, or take all six (6) credit hours in Spring II. Completing the course does not mean they have completed their thesis. Thesis completion follows the requirements laid out in the Student Handbook and is not achieved by a for-credit course.

Thesis

The thesis is expected to be a scholarly achievement in research that demonstrates a thorough understanding of research techniques in epidemiology. It is expected to be original, professional quality, and worthy of publication, in whole or in part, in the peer-reviewed scientific literature.

Thesis Committee

A thesis committee consists of three faculty members. The committee chair must be an active, full-time faculty member in the Department of Epidemiology and Population Health. At least one member must be from another department in SPHIS, another school or unit in the university, or outside of the university pending approval of graduate faculty status. In all cases, the majority of a committee must hold primary appointments in the department.

Thesis Proposal

Students are required to submit a written proposal and make a formal oral presentation to their committee before embarking on thesis research.

The proposal should include a brief, but comprehensive literature review supporting an acceptable research rationale, hypotheses and specific aims, a proposed study design, a preliminary outline of methods, a list of resources, and a tentative timetable. The committee will discuss with the student any revisions needed before the student can progress with their research.

Thesis Preparation

The thesis is to be prepared in format and binding according to the guidelines established by the Graduate School (<http://louisville.edu/graduate/current-students/thesis-dissertation-information/>).

Thesis Approval

The written thesis must be submitted in completed form to all members of the committee at least thirty days before the end of the term in which the candidate expects to graduate

The student must schedule their oral defense at least two weeks in advance so that the time and place for the oral presentation may be posted to the faculty and students of SPHIS and general academic community who are free to attend. The student should also pay close attention to university deadlines for submitting their work to the Graduate School and in relation to graduation.

The thesis is approved by a majority vote of the committee.

Thesis Submission

The following steps must be taken to submit the final copy of the thesis electronically after oral defense and approval of the committee:

- a. Final document must be converted to a PDF (following the guidelines as noted above) and sent to the Graduate School and the department's administrative assistant.
- b. Submit as advised by the Graduate School through the ThinkIR repository. The directions on submission will be provided upon review of the thesis by the Graduate School.
- c. The signature page within the electronic version must have the names of your committee members typed under the signature line; the signatures cannot be scanned into the document.
- d. Submit a signed signature page (digital/electronic signature page (<http://louisville.edu/graduate/current-students/thesis-dissertation-information/>) can be found on the Graduate School web-site) to the Graduate School.

A copy of the final, signed thesis must also be deposited with the department office.