Epidemiology Major – Ph.D.

The extensive epidemiologic research programs offer students many opportunities for doctoral-level training. The curriculum reflects the rigorous methodological and research skills students need to be leaders in this field. Students study with experts in cancer, cardiovascular and infectious disease, nutrition, maternal, child, and reproductive health, genetic epidemiology, behavioral interventions, and epidemiologic methods for clinical, observational, and community-based research.

Program Curriculum

• Choice of Two Tracks

The Epidemiology Ph.D. program is designed for students interested in research and teaching careers in the health sciences. Students will select one of two tracks: clinical/biological epidemiology (CBE) or social/behavioral epidemiology (SBE). The two tracks, each with a minimum of 63 credits, emphasize advanced epidemiologic design, methodology and analytic skills. The social/behavioral epidemiology track focuses on origins and development of human behavior patterns and how they are influenced and formed by personality, family, culture, and environment. The clinical/biological epidemiology track focuses on the etiology of diseases, particularly cancer, cardiovascular, and infectious disease.

Core Curriculum

17 credits + 24 thesis credits

○ Advanced Epidemiology Methods: Concepts (3 credits)
○ Advanced Epidemiology Methods: Applications (3 credits)
○ Biostatistics (recommend PubH 7401, Fundamentals of Biostatistical Inference, 4 credits)
○ Writing Research Grants (PubH 6348, 2 credits)
○ Ethics in Public Health: Research and Policy (PubH 6742, 1 credit)
○ Seminar in Chronic Disease and Behavioral Epidemiology (PubH 8377, 1 credit)
○ Teaching in Higher Education (Grad 8101, 3 credits)
○ Thesis Credits (PubH 8888, 24 credits)

Clinical/Biological Track
(22 credits minimum)

Biological Methods/Statistics
(6 credits minimum)

○ Required: Clinical Trials: Design, Implementation, and Analysis (PubH 7420, 3 credits)

Choose additional credits from the following courses:

○ Design and Analysis of Group-Randomized Trials in Epidemiology (PubH 6363)
○ Biostatistical Modeling and Methods (PubH 7402)
○ Statistical Methods for Correlated Data (PubH 7430)
○ Latent Variable Measurement Models and Path Analysis (PubH 7435)
○ Analysis of Categorical Data (PubH 7407)
○ Hierarchical Linear Modeling in Educational Research (EPSY 8268)

Contact Information

Major Coordinator
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○ Statistical Analysis of Longitudinal Data (EPSY 8282)
○ Validity Concepts in Epidemiologic Research (PubH 8140)
○ Nutrition Assessment (PubH 6915)
○ Statistics for Human Genetics and Molecular Biology (PubH 7445)
○ Doctoral Seminar in Observational Inference (PubH 8141)
○ Pathophysiology of Human Disease (PubH 6355)

Content area courses (4 credits minimum)

○ Public Health Aspects of Cardiovascular Disease (PubH 6386)
○ Cancer Epidemiology (PubH 6387)
○ Epidemiology and Control of Infectious Diseases (PubH 6385)
○ Genetics in Public Health (PubH 6381)
Supporting Program/Minor (12 credits minimum)

Supporting program credits to be chosen with consultation with advisor.

Social/Behavioral Track (22 credits minimum)

Behavioral Methods/Statistics (6 credits minimum)

- Required: Design and Analysis of Group-Randomized Trials in Epidemiology (PubH 6363, 3 credits)

Choose additional credits from the following courses:

- Biostatistical Modeling and Methods (PubH 7402)
- Clinical Trials: Design, Implementation, and Analysis (PubH 7420)
- Statistical Methods for Correlated Data (PubH 7430)
- Latent Variable Measurement Models and Path Analysis (PubH 7435)
- Analysis of Categorical Data (PubH 7407)
- Hierarchical Linear Modeling in Educational Research (EPSY 8268)
- Statistical Analysis of Longitudinal Data (EPSY 8282)
- Validity Concepts in Epidemiologic Research (PubH 8140)
- Nutrition Assessment (PubH 6915)
- Advanced Multiple Regression Analysis (EPSY 8264)
- Applied Multivariate Analysis (EPSY 8267)
- Psychological Scaling (EPSY 8221)

Content area courses (4 credits minimum)

- Human Behavior I (PubH 6333)
- Human Behavior II (PubH 6334)

Supporting Program/Minor (12 credits minimum)

Supporting program credits to be chosen with consultation with advisor.

Program Requirements

I. Program Plan
The Ph.D. core curriculum is required for all Epidemiology Ph.D. students. Any course substitutions or waivers need to be approved by the student's advisor and the credentials committee. The final shape of the program, the nature of additional courses, readings, and the focus on particular subspecialties are a matter for the student and advisor to decide.

II. Grantwriting Skills
In addition to completing PubH 6348, it is recommended that students participate as a member of a grant-writing team for an NIH or comparable grant, preferably with their advisor or another member of their Ph.D. committee.

III. Teaching
Ph.D. students have three teaching requirements:

a) Teaching in Higher Education (Grad 8101);
b) one semester as a teaching assistant; and
c) preparing and giving a course lecture.

IV. Examinations

- Preliminary Written Examination
  Students entering with a master's degree in epidemiology are encouraged to write the examination within 18 months of matriculation into the Ph.D. program. The examination consists of two parts: (1) epidemiology and biostatistics exam, and (2) a grant-writing exercise. Students must pass both sections.
- Preliminary Oral Examination
  Students should take the preliminary oral examination within six months of completing the preliminary written examinations. The oral examination, administered by the student's committee, focuses on plans for thesis design and analysis. Students have a maximum of five years to complete the Ph.D. after passing the preliminary oral exam.
- Final Oral Examination and Seminar Presentation
  The first hour of the final oral examination is open to the public.

V. Research

- First-Authored Manuscript for Publication
  During their Ph.D. studies, students must prepare a first-authored manuscript for publication. The paper must be written in a form acceptable for publication, the student's committee must agree that the paper is publishable, and it must be submitted for publication.

- Research Ethics Training
  All Graduate School students in the health sciences are required to have research ethics training during their doctoral studies. Epidemiology doctoral students take PubH 6742, Ethics in Public Health: Research and Policy.

Ph.D. Dissertation
The process to complete a dissertation is twofold: students must pass a preliminary oral exam and a final oral exam. Students have two options for the dissertation: (1) a traditional dissertation, which is an in-depth volume describing (a) theoretical background and literature to date, (b) the methods and results of a research project, and (c) a detailed discussion of the strengths, limitations, interpretation, and significance of the findings; or (2) a series of publishable papers, with appropriate introductory and concluding sections (most common option).
VI. Research Administration Experience
Students should develop experience in research administration during their program through regular participation in project-staff or steering committee meetings, helping to prepare or administer a grant budget, taking an operational role in a sponsored research project, etc.

Research Activities
Epidemiology graduate faculty have developed and are investigators in numerous research studies, including population-based surveillance and observational studies of cardiovascular disease, cancer, and infectious disease; clinical and community trials; community-based health promotion and program evaluation; studies about the role of genetic polymorphisms and environmental interactions; laboratory studies; reproductive health; and social and behavioral epidemiology. Faculty have strong collaborative ties with the College of Veterinary Medicine, the Medical School, and the School of Public Health’s Division of Environmental Health Sciences, as well as the Minnesota Department of Health.

A detailed list of the research projects in the Division of Epidemiology and Community Health, which can be searched by research areas or principal investigators, is available at sph.umn.edu/epi/research/

Admission Preferences
Students admitted to the program hold advanced degrees in a related field. Individuals whose highest degree is a baccalaureate degree may apply for an M.P.H. degree. Applicants should have prior coursework in biological or behavioral sciences. Also, because of this program’s strong emphasis on methodology, quantitative aptitude is very important, as demonstrated by achieving a 70th percentile on the quantitative section of the Graduate Record Examination (GRE) and satisfactory grades in college-level courses including statistics, algebra, calculus, or trigonometry.

Ph.D. applicants are asked to submit both a letter of intent and a statement of research interests. The statement of research interests is intended for the applicant to demonstrate a strong interest in a specific epidemiologic area and, if possible, to indicate interest in particular methodologies or study designs. Familiarity with the field is essential for successful application to the program.

All serious candidates to the doctoral program are encouraged to contact Major Coordinator Andrea Kish in the early fall prior to completing the application materials to obtain additional information about the application process.

Application Deadlines
- Priority: December 1
- Final: February 15

Applicants to the Epidemiology doctoral program are strongly encouraged to apply by the Priority deadline or shortly after that date.

Admission Decisions
The admissions committee meets after the December 1 application deadline to begin reviewing applications. Ph.D. applicants are notified by mail of the admissions decision.

Combined MD/PhD Program
The mission of the University of Minnesota Combined MD/PhD Program is to train a diverse group of intellectually gifted students to become physician-scientists and leaders in the global effort to preserve and restore human health. The program is housed in the Medical School; for more information, please contact:

Combined MD/PhD Training Program
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Sample Epidemiology Doctoral Thesis Titles
- Epidemiological Associations of Metabolic Factors with Cancer Risk and Cancer Late Effects
- Effects of Statewide Coalitions on Public Opinions towards Alcohol Policies: Results from the Reducing Underage Drinking through Coalitions Project
- Glycemic Index, Glycemic Load and Risk for Obesity and Metabolic Syndrome in Young Adults: the CARDIA Study
- V.I.K. (Very Important Kids): Pilot Program to Impact Weight-Related Teasing, Dieting, Internalization of Media Messages, and Body Satisfaction among Children
- The Effect of Racial Residential Segregation on Infant Mortality and Black-White Infant Mortality Disparities
- Perigestational Risk Factors for Childhood Cancer: Three Investigations
- The Unintended Consequences of Clean Indoor Air Policies in Minnesota
- Etiology of Sexual Development among Adolescents in Northern Tanzania
- Parenting Practices and Early Adolescent Alcohol Use in Urban, Ethnically Diverse Youth
- An Epidemiologic and Genetic Examination of Associations among Waist, Adiponectin and Insulin Sensitivity
- Genetic Factors in Bone Density, Fracture Risk and Arterial
Calcification: An Epidemiological Investigation Using the Study of Osteoporotic Fractures (SOF) and the Coronary Artery Risk Development in Young Adults Study (CARDIA)

- Pre-Screening Tools for Diabetes: An Escalating Approach in Diverse Populations Evidence from CODA Project
- Evaluation of a Strength Training Intervention and Physical Activity Measurement: The Strong, Health, and Empowered (SHE) Study
- City-Level Effects of Tobacco Youth Access Control