**POPULATION HEALTH, M.S.**

The Department of Population Health Sciences, part of the School of Medicine and Public Health, strives to provide leadership in the emerging, integrative field of population health. Its mission is to create, integrate, disseminate, and apply knowledge promoting the most efficient, equitable, and effective possible use of resources to maintain and improve the health of populations.

The department offers two graduate degree programs: an M.S. and a Ph.D. in population health and an M.S. and Ph.D. in epidemiology. Concentrations are available in epidemiology, health services research, social and behavioral health sciences, and clinical research.

The research-oriented degree programs are designed to provide rigorous, interdisciplinary training to develop students' abilities to synthesize knowledge and skills needed to address today's health-related problems. Methodological and analytical training is grounded in biostatistics, epidemiology, and health services research, but also emphasizes methods employed in the social sciences and econometrics that contribute to the study of health in populations. While the program is based on a sequence of core courses, students, in consultation with their major professor, have the flexibility to design advanced study and research that best prepares them for their chosen area of interest.

Individuals choose this program because of its innovative approach, strong research focus, and personal attention to students. It is an ideal option for those considering a broad array of fields including epidemiology, public health, health policy, health economics, health services research, environmental health, industrial engineering, demography, and more. UW–Madison ranks as one of the most prolific research universities in the world, consistently placing in the top five among American public universities for research expenditures. The program's interdisciplinary focus allows students the flexibility to work with a wide array of research/faculty on campus. For instance, program faculty include members from a number of other departments such as business, family medicine, industrial engineering, law, medical history and bioethics, medicine, nursing, ophthalmology, public affairs, sociology, and veterinary medicine. The multidisciplinary faculty coupled with the diverse backgrounds of the students provides a rich and stimulating training environment.

Faculty, staff, and students in the Department of Population Health Sciences engage in a wide variety of epidemiological and health services world-class research projects to understand determinants of health and health problems in populations, to analyze public and clinical health policies, and to improve the effectiveness and efficiency of healthcare. Research topics may include (but are not limited to) chronic, infectious, and environmental disease epidemiology; public health; studies of medical outcomes; health economics; the determinants and measurement of population health status; and health administration and policy. These multidisciplinary research programs may include (but are not limited to) the study the effects and interactions of genetic traits; biologic and metabolic processes; pathogens; pollutants; lifestyles; behaviors; economic social and physical environments; and public health and health care systems on the health of populations. Methods employed involve developing and maintaining long term cohort studies, disease registries, population surveys, and retrospective analyses of large observational databases. Researchers in the department also work to advance methodology in health economics, population health evaluation, and statistical analyses.

For more information, see the graduate program Academic Guide (http://www.pophealth.wisc.edu/Current-Students/Policy-Procedures/Handbooks).

**FUNDING**

Students admitted to our degree programs are automatically considered for any available scholarships, traineeships, or graduate assistant positions in the department. The most common forms of funding support for our students are assistantships, traineeships, and fellowships.

**MINIMUM DEGREE REQUIREMENTS AND SATISFACTORY PROGRESS**

To make progress toward a graduate degree, students must meet the Graduate School Minimum Degree Requirements and Satisfactory Progress (http://guide.wisc.edu/graduate/#policiesandrequirements) in addition to the requirements of the program.

**MASTER'S DEGREES**

M.S., with available named option in Epidemiology

**MINIMUM GRADUATE DEGREE CREDIT REQUIREMENT**

33 credits

**MINIMUM GRADUATE RESIDENCE CREDIT REQUIREMENT**

21 credits

**MINIMUM GRADUATE COURSEWORK (50%) REQUIREMENT**

100% of all coursework taken as a graduate student must be in graduate-level coursework; courses with the Graduate Level Coursework attribute are identified and searchable in the university's Course Guide (http://my.wisc.edu/CourseGuideRedirect/BrowseByTitle).

**PRIOR COURSEWORK REQUIREMENTS: GRADUATE WORK FROM OTHER INSTITUTIONS**

With program approval, students are allowed to count a maximum of 12 credits of graduate coursework taken from other institutions as a graduate student. coursework earned five or more years prior to admission to a master's degree is not allowed to satisfy requirements.

**PRIOR COURSEWORK REQUIREMENTS: UW–MADISON UNDERGRADUATE**

No credits from a UW–Madison undergraduate degree are allowed to count toward the degree.

**PRIOR COURSEWORK REQUIREMENTS: UW–MADISON UNIVERSITY SPECIAL**

With program approval, students are allowed to count no more than 12 credits of coursework numbered 300 or above taken as a UW–Madison
University Special student. Coursework earned five or more years prior to admission to a master’s degree is not allowed to satisfy requirements.

CREDITS PER TERM ALLOWED
15 credits

PROGRAM-SPECIFIC COURSES REQUIRED

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>POP HLTH/B M I 451</td>
<td>Introduction to SAS Programming for Population Health</td>
<td>2</td>
</tr>
<tr>
<td>POP HLTH/B M I 551</td>
<td>Introduction to Biostatistics for Population Health</td>
<td>3</td>
</tr>
<tr>
<td>POP HLTH/B M I 552</td>
<td>Regression Methods for Population Health</td>
<td>3</td>
</tr>
<tr>
<td>POP HLTH 795</td>
<td>Principles of Population Health Sciences</td>
<td>1-3</td>
</tr>
<tr>
<td>POP HLTH/SOC 797</td>
<td>Introduction to Epidemiology</td>
<td>3</td>
</tr>
<tr>
<td>POP HLTH 820</td>
<td>Graduate Research Seminar</td>
<td>1</td>
</tr>
</tbody>
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Select two additional methods courses
Select a minimum of 1 credit of medical ethics

1. One of which must be POP HLTH 796 Introduction to Health Services Research or POP HLTH 798 Epidemiologic Methods.
2. Some students must also complete this course.

OVERALL GRADUATE GPA REQUIREMENT
Students must maintain a cumulative GPA of at least 3.25 in all graduate work (including transfer credits) unless conditions for probationary status require higher grades. Students must also maintain a cumulative GPA of 3.25 or better in all coursework completed while enrolled in the population health graduate program. No grade of BC or lower in epidemiology required courses will be accepted for the degree.

OTHER GRADE REQUIREMENTS
Maintain no more than 6 credits of Incomplete (I) grades during any semester.

PROBATION POLICY
A student not meeting guidelines for satisfactory progress will be placed on probation for one semester and will be reviewed by the steering committee following the probationary semester. Students may be dropped or allowed to continue by the committee based on review of progress during the probationary semester.

ADVISOR / COMMITTEE
All students will have a hold placed on their registration each semester. Students must meet with their advisor once each semester for academic advising to have the hold removed.

ASSESSMENTS AND EXAMINATIONS
No formal examination required.

TIME CONSTRAINTS
Thesis required. Approval of a written proposal for thesis research is required before beginning thesis. M.S. candidates must submit Master’s thesis to advisor within two years of completing all coursework.

Master’s degree students who have been absent for five or more consecutive years lose all credits that they have earned before their absence.

LANGUAGE REQUIREMENTS
No language requirements.

ADMISSIONS
Applications are welcome from students with diverse academic backgrounds. Students with strong academic preparation in the biological/medical sciences, quantitative analysis, and/or population health related social sciences are strongly encouraged to apply. Historically, many applicants who have succeeded in our program have come to the program with backgrounds in fields as diverse as microbiology, genetics, nutritional sciences, medicine, nursing, pharmacy, veterinary medicine, environmental sciences, political sciences, business, sociology, education, engineering, psychology, and economics.

Minimum requirements are:

1. Applicants must have an undergraduate degree with a grade point average of 3.0 (on a 4.0 scale), although successful applicants generally have GPAs above 3.0.
2. GRE are required for admission. The scores must be no more than five years old at the time of application. For applicants who have completed a doctoral degree, GRE scores are preferred but the program will accept scores for the entrance exam required for the doctoral degree (e.g., MCAT, LSAT). Students should contact the graduate program coordinator to find out if their scores are competitive.
3. Applicants whose native language or language of study is not English must submit official TOEFL scores. Scores must be no more than five years old at the start of the semester for which an applicant is applying. Further details are available on the Graduate School website (http://grad.wisc.edu/admissions/requirements). Note that the minimum test scores for the program are higher than those required by the Graduate School. For the Test of English as a Foreign Language, TOEFL (http://www.toefl.org), a minimum score of 580 (written), 237 (computer-based), or 92 (Internet-based) or above is absolutely required.
4. At least one semester of advanced quantitative preparation (calculus is strongly preferred) with a grade of B or better.
5. A personal statement and three letter of recommendation are required.
6. Applicants must meet both the above departmental admission requirements and the Graduate School admission requirements.

Upon entry to the graduate programs, students are matched with a faculty advisor. Faculty advisors help students hone their interests, assist with identifying research projects, provide support for career development, and link students to the greater campus community. Students have the benefit of regular dialogues with faculty members. Seminars and integrated discussion groups allow for increased interaction with core faculty and community lecturers. Finally, the work of students is valued as evidenced by their entries in the annual department poster session, participation in public health symposia, authorship of publications, and involvement in community/research projects.
LEARNING OUTCOMES

KNOWLEDGE AND SKILLS

HEALTH SERVICES RESEARCH

- Understand and apply principles of population health science in characterizing: (a) the multiple determinants of health; and (b) the allocation of resources across those determinants and its influence on health and health disparities.
- Understand and apply principles of microeconomic theory relating to human and institutional decisions in the allocation of scarce resources for the production of health at individual, system and population levels.
- Understand and apply the principles of health outcomes measurement and its role in the design of health services, policy, intervention and evaluation.
- Describe the historical and current organization, delivery and financing of health care services in the United States.
- Describe the historical and current role of government in the regulation, provision and financing of health care services in the United States.
- Describe the role of social institutions, culture and behavior on the production of health at individual, system and population levels.
- Apply economic principles to describe, predict and evaluate the impact of government policy on the production of health and health care.
- Understand advantages and disadvantages of experimental, quasi-experimental and observational study designs for the evaluation of interventions, policies and processes that affect utilization and cost of health services and/or the production of health.
- Have a working knowledge of the availability, use, advantages and limitations of various sources of publicly available and/or electronically captured data on health care utilization and outcomes, including but not limited to: major surveys of healthcare utilization, electronic medical records and administrative claims datasets.

BIOSTATISTICS

- Be thoroughly familiar with how to organize and manipulate data and perform basic statistical analyses in at least one major statistical software package (SAS, Stata, or R, perhaps SPSS is sufficient for some).
- Be familiar with the basic concepts of probability, random variation and commonly used statistical probability distributions and their applications in health research.
- Understand the foundations of statistical inference such as parameters, estimators, hypothesis tests and confidence intervals.
- Be able to describe samples appropriately, using measures of central tendency and dispersion.
- Know and assess assumptions and types of data needed for different common approaches to compare samples and be able to conduct and interpret these comparisons.
- Fit and interpret the results from linear, logistic and Cox regression models (including logistic models with multiple outcome categories and those for case-control data).
- Understand and be able to assess the assumptions of linear, logistic and Cox models.
- Explain the results of the above statistical analyses in subject matter terms to researchers and health professionals.
- Understand how measures of association, risk and rate learned in epidemiology courses relate to estimators arising from the above models.
- Apply the concepts of intermediate variables, confounding variables, and interacting variables in the process of variable selection and model building.

EPIDEMIOLOGY

- Have basic knowledge of human physiology and pathophysiology, with special competence in the aspects of health addressed in the student’s thesis or dissertation.
- Know the methods and measures of descriptive epidemiology, including case definition, calculation of the primary measures of disease morbidity and mortality, and appropriate comparisons by person, place and time.
- Be familiar with major disease categories and leading causes of death, their general pathophysiology, descriptive epidemiology & risk factors, and with the multiple determinants of health, including social, behavioral and other influences on the health of individuals and populations.
- Understand the concepts and practical implications of random and systematic errors (i.e. sampling error and bias: information, selection and confounding bias) as they apply to causal inferences in observational studies.
- Understand the concepts and practical implications of interaction, effect modification, and mediation of causal effects in observational studies.
- Identify the basic study designs used in epidemiologic research and know the advantages and disadvantages of each (including cross-sectional, case-control, cohort, and randomized trials).
- Understand principles of causal inference in epidemiologic studies and be able to critique, use or discuss them in the context of evaluating evidence. This includes application of the counterfactual model in estimation of causal effects and the ability to explain assumptions needed for valid estimation of causal effects in epidemiologic studies.
- Be familiar with publicly available national and international data sources and resources, and know how to start accessing them.
- Read and critique studies with respect to most common biases (confounding, selection bias, and information bias), as well as role of random error, and interpretation of results.
- Synthesize available information by searching, review and critically evaluating the literature.
- Have in depth knowledge of at least one health condition, disease or risk factor area.
- Have in depth understanding of at least one methodological issue that arises in epidemiologic research.
- Know the uses and principles of screening, including the concepts of validity and reliability of screening tests and be able to calculate and interpret associated measures.
- Know the uses and principles of public health surveillance and the types of surveillance systems and approaches used in disease surveillance.
- Understand the global, cultural, and social context of health problems and how these influence the conduct, interpretation, and dissemination of research.
• Understand and apply the concepts of human subjects protections and confidentiality, and awareness of particular issues relevant to the study of specific populations.
• Understand and adhere to the principles of communicating epidemiologic research methods and results honestly and with integrity.
• Explain the importance of epidemiology for informing scientific, ethical, economic and political discussion of health issues.

PROFESSIONAL CONDUCT

• Recognizes and applies principles of ethical and professional conduct as they apply to Population Health Sciences.

PEOPLE

Faculty: Professors Nieto (chair), Cruickshanks, Durkin, Kanarek, Mullahy, Oliver, Palta, Patz, Remington, M. Smith, Wolfe, Young; Associate Professors Astor, Bautista, Engelman, Gangnon, Jacobs, Martinez-Donate, Olson, Peppard, Sethi, Si, Timberlake, Trentham-Dietz, Vanness; Assistant Professors M. Burns, DuGoff, Malecki, Pillai; CHS Professor Brokopp