

# Epidemiology

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The Graduate Group in Epidemiology is interdisciplinary and includes faculty from a number of departments at UC Berkeley, as well as the University of California, San Francisco (UCSF). Students receive either an MS or PhD degree in Epidemiology from the Graduate Division of the Berkeley campus. The group is within the academic jurisdiction of the Graduate Council and is administratively located in the Division of Epidemiology in the School of Public Health.

The group brings together faculty with disciplinary knowledge in epidemiology, biostatistics, economics, demography, sociology, anthropology, behavioral science, molecular biology, genetics, vector biology, and other fields relevant to the study of human health and disease at a population level. MS and PhD students receive a strong background in epidemiologic and biostatistical methods and theory and, in addition, choose a third disciplinary area in which to develop competence. Doctoral dissertation research is generally focused on developing new knowledge about the factors that influence the distribution of health or given disease outcomes within human populations.

## Admission to the University

### Minimum Requirements for Admission

The following minimum requirements apply to all graduate programs and will be verified by the Graduate Division:

1. A bachelor's degree or recognized equivalent from an accredited institution;
2. A grade point average of B or better (3.0);
3. If the applicant has completed a basic degree from a country or political entity (e.g., Quebec) where English is not the official language, adequate proficiency in English to do graduate work, as evidenced by a TOEFL score of at least 90 on the iBT test, 570 on the paper-and-pencil test, or an IELTS Band score of at least 7 on a 9-point scale (note that individual programs may set higher levels for any of these); and
4. Sufficient undergraduate training to do graduate work in the given field.

### Applicants Who Already Hold a Graduate Degree

The Graduate Council views academic degrees not as vocational training certificates, but as evidence of broad training in research methods, independent study, and articulation of learning. Therefore, applicants who already have academic graduate degrees should be able to pursue new subject matter at an advanced level without the need to enroll in a related or similar graduate program.

Programs may consider students for an additional academic master's or professional master's degree only if the additional degree is in a distinctly different field.

Applicants admitted to a doctoral program that requires a master's degree to be earned at Berkeley as a prerequisite (even though the applicant already has a master's degree from another institution in the same or a closely allied field of study) will be permitted to undertake the second master's degree, despite the overlap in field.

The Graduate Division will admit students for a second doctoral degree only if they meet the following guidelines:

1. Applicants with doctoral degrees may be admitted for an additional doctoral degree only if that degree program is in a general area of knowledge distinctly different from the field in which they earned their original degree. For example, a physics PhD could be admitted to a doctoral degree program in music or history; however, a student with a doctoral degree in mathematics would not be permitted to add a PhD in statistics.
2. Applicants who hold the PhD degree may be admitted to a professional doctorate or professional master's degree program if there is no duplication of training involved.

Applicants may apply only to one single degree program or one concurrent degree program per admission cycle.

### Required Documents for Applications

1. **Transcripts:** Applicants may upload *unofficial* transcripts with your application for the departmental initial review. Unofficial transcripts must contain specific information including the name of the applicant, name of the school, all courses, grades, units, & degree conferral (if applicable).
2. **Letters of recommendation:** Applicants may request online letters of recommendation through the online application system. Hard copies of recommendation letters must be sent directly to the program, by the recommender, not the Graduate Admissions.
3. **Evidence of English language proficiency:** All applicants who have completed a basic degree from a country or political entity in which the official language is not English are required to submit official evidence of English language proficiency. This applies to institutions from Bangladesh, Burma, Nepal, India, Pakistan, Latin America, the Middle East, the People's Republic of China, Taiwan, Japan, Korea, Southeast Asia, most European countries, and Quebec (Canada). However, applicants who, at the time of application, have already completed at least one year of full-time academic course work with grades of B or better at a US university may submit an official transcript from the US university to fulfill this requirement. The following courses will not fulfill this requirement:
  - courses in English as a Second Language,
  - courses conducted in a language other than English,
  - courses that will be completed after the application is submitted, and
  - courses of a non-academic nature.

Applicants who have previously applied to Berkeley must also submit new test scores that meet the current minimum requirement from one of the standardized tests. Official TOEFL score reports must be sent directly from Educational Test Services (ETS). The institution code for Berkeley is 4833 for Graduate Organizations. Official IELTS score reports must be sent electronically from the testing center to University of California, Berkeley, Graduate Division, Sproul Hall, Rm 318 MC 5900, Berkeley, CA 94720. TOEFL and IELTS score reports are only valid for two years prior to beginning the graduate program at UC Berkeley. Note: score reports can not expire before the month of June.

## Where to Apply

Visit the Berkeley Graduate Division application page (<http://grad.berkeley.edu/admissions/apply/>).

## Admission Criteria for the Epidemiology MS & PhD

### *MS in Epidemiology*

Applicants to the MS in Epidemiology must have a strong background in biological, social, or mathematical science, which will provide a basis for the application of epidemiological methods and principles to the study of diseases. Common undergraduate majors for admitted applicants include the biological, social, or mathematical sciences. Work and research in a public health setting also greatly strengthens an application.

Admission to the MS in Epidemiology is very limited. Depending on your background and interests, we encourage you to also consider the Epidemiology and Biostatistics MPH (<https://publichealth.berkeley.edu/academics/epidemiology-and-biostatistics/epidemiology-biostatistics-mp/>) program.

### *PhD in Epidemiology*

The PhD admissions committee considers an applicant's previous coursework, related experience, personal background, and professional goals. A Master's degree in Epidemiology or a related field is preferable. Successful applicants often have work experience in a public health setting or in epidemiological research.

**The School of Public Health has specific admissions instructions and criteria that are separate from that of the larger campus (above).** Please visit the School of Public Health website (<https://publichealth.berkeley.edu/admissions/graduate/application-instructions/>) for a full list of instructions and deadlines.

## Normative Time Requirements

### Normative Time to Advancement

#### Step 1

When students are admitted they are expected to have narrowed down their interests in a particular area of epidemiology. Areas of concentration include but are not limited to: social epidemiology and disparities, infectious diseases, nutritional epidemiology, substance abuse and violence, causal methods, women's health, HIV, genetic, etc.

#### Step 2

All students not advanced to candidacy are required to take a doctoral seminar to review grant writing, dissertation and QE procedures, and ethics. This step takes one to three years depending on the student's level of preparation. With the successful passing of the qualifying exam, students need to complete Step 3 to be advanced to candidacy for the PhD degree.

#### Step 3

In order to advance to candidacy for the PhD degree after passing oral qualifying examination, a dissertation topic must be chosen, a dissertation committee appointed, and a detailed written prospectus outlining the thesis research to be conducted must be submitted and approved by the dissertation committee. Normative time to complete the PhD degree after advancement is three years.

## Total Normative Time: Five Years

### Time to Advancement

#### Course Curriculum

The amount of coursework necessary for each doctoral student in the PhD program will vary depending on the student's previous educational experience and background. However, the graduate group requires competence in the material covered by the following courses. (Note: Graduate Division requires that no more than one-third of units in an individual's total curriculum while at UC Berkeley be taken as Satisfactory/Unsatisfactory. PB HLTH 299 series courses are not counted in this calculation.)

#### Courses Required

|                              |  |     |
|------------------------------|--|-----|
| PB HLTH 250A                 | Epidemiologic Methods I (if a student has limited epi background )<br>or PBHLTH W2Course Not Available   | 3   |
| PB HLTH 250B                 | Epidemiologic Methods II (Students can skip to PBHLTH 252 if they have a graduate level background in Epi. )<br>or PBHLTH W2Course Not Available | 4   |
| PB HLTH 241                  | Intermediate Biostatistics for Public Health<br>or PBHLTH W2Course Not Available   | 4   |
| PB HLTH 252                  | Epidemiological Analysis<br>or PBHLTH W2Course Not Available   | 4   |
| PB HLTH 250C                 | Advanced Epidemiologic Methods   | 4   |
| PB HLTH 252D                 | Introduction to Causal Inference   | 4   |
| PB HLTH 249                  | Grant Writing (Fall of second year)  | 3   |
| PB HLTH 293                  | Doctoral Seminar (enrolled in first two semesters)   | 2   |
| <b>Recommended Electives</b> |  |     |
| PB HLTH 207A                 | Public Health Aspects of Maternal and Child Nutrition  | 2,3 |
| PB HLTH C242C                | Longitudinal Data Analysis   | 4   |
| PB HLTH 245                  | Introduction to Multivariate Statistics  | 4   |
| PB HLTH 252C                 | Intervention Trial Design  | 2   |
| PB HLTH 253B                 | Epidemiology and Control of Infectious Diseases  | 3   |
| PB HLTH 253E                 | Ethical Challenges in Public Health Interventions: Catastrophic and Routine  | 2   |
| PB HLTH 255A                 | Social Epidemiology  | 4   |
| PB HLTH 255D                 | Methods in Social Epidemiology   | 2   |
| PB HLTH C256A                | Human Genome, Environment and Human Health   | 3   |
| PB HLTH 257                  | Outbreak Investigation   | 2   |
| PB HLTH 258                  | Cancer Epidemiology  | 3   |

<sup>1</sup> One semester of Causal Inference is required (PB HLTH 252D: Causal Inference I or PB HLTH 252E: Causal Inference II), but we recommend enrolling in both.

In addition, students are expected to develop expertise in a third area, which is a content or methods area not included in the above required content. The selection of an area is at the discretion of the student but should be discussed with the student's adviser as soon as possible, since content in the third area is part of the qualification examination for advancement to candidacy.

## Qualifying Examination

Once a student's faculty adviser has certified that the student is adequately prepared to take the qualifying examination, the student must submit an eform for the qualifying examination via CalCentral. The Graduate Division requires that this application be submitted a minimum of three weeks prior to the proposed date of the qualifying examination.

## CITI Protocol Course Certifications

Doctoral students are responsible for obtaining any necessary approvals or exemptions from the UCB Committee for the Protection of Human Subjects for carrying out their dissertation research BEFORE they begin data collection or analysis of an extant data set, even if the study has received institutional review board approval elsewhere and/or previously collected data are being used.

All students who plan to engage in human subjects research must first complete and pass the appropriate Collaborative IRB Training Initiative (CITI) web-based education program modules. They can then be *certified* to serve as a lead investigator or as key personnel on any UCB human subjects research project.

## Time in Candidacy

### Advancement

Once a student has passed the oral qualifying examination, the student submits an Application for Advancement to Candidacy eform and a copy of the student's CITI certification via CalCentral. The application form must be signed by the chair of the dissertation committee and accompanied by a check for \$90 made payable to the UC Regents. Candidacy is good for 6 semesters/3 years. Students who do not complete the PhD within that time, plus a two-year grace period, will have their candidacy lapsed by the Graduate Division.

## Prospectus

In preparation for the qualifying examination, each student must prepare a written prospectus. The prospectus must take the form of a detailed proposal for an epidemiologic study. In most instances, the prospectus will be directly related to the student's proposed dissertation research, although it is not a requirement that it be so. The prospectus should be written for an audience with general knowledge of epidemiologic and biostatistical principles and methods, but knowledge that is highly specific to the proposed study, particularly knowledge relating to clinical, laboratory, environmental, genetic, or social/behavioral variables, and scales should not be assumed. Through his/her/their prospectus, the student is expected to demonstrate convincingly that he/she possesses the following skills: conceptual, problem solving, critical/creative, and writing.

## Dissertation

Dissertation committees must be chaired by a UC Berkeley Academic Senate member. The dissertation committee for the PhD consists of three faculty members, one of whom must be from outside the Group in Epidemiology and a UC Berkeley Academic Senate member. Doctoral students are expected to meet with all members of the dissertation committee at least annually to review progress toward completion of the dissertation research.

## Dissertation Presentation

Doctoral students are expected to present their research plans and progress/results periodically in the epidemiology doctoral seminar PH 293. While the Graduate Division does not require a public thesis

defense, all doctoral students are expected to present the findings of their dissertation research in a scheduled seminar during the semester. Two venues are available: PH 293 and the Annual Epidemiology Retreat early every calendar year.

## Required Professional Development

### Teaching

Every doctoral student in epidemiology is expected to serve for at least one semester as a Graduate Student Instructor (GSI) before taking the qualifying examination. Teaching fortifies theoretical knowledge gained in coursework, prepares students for academic careers, and provides service to the division and the School of Public Health. GSIs are required to complete a 300-level semester-long teaching pedagogy seminar before or during their first teaching appointment at Berkeley. The Graduate Division also mandates that first-time GSIs take the on-line course on GSI Professional Standards and Ethics Course and attend a teaching conference. For more information, please see the GSI website.

### Ethics Training

Knowledge of how to conduct ethical research is essential. In addition to a required course in research ethics in epidemiology, all doctoral students must complete the UC Berkeley Online Human Subjects Training prior to taking the qualifying examination.

## Academic Residence Requirement

Epidemiology doctoral students must register and enroll in at least 12 units per semester for a minimum of four semesters of academic residence at Berkeley.

## Unit requirements

MS students in epidemiology are under Graduate Division Plan II, which requires a minimum of 48 units and a final paper/capstone or Master's thesis. The MS degree requires two years of academic residence to meet minimum requirements. Students admitted to the MS program are generally limited to those considered highly likely to seek admission to doctoral studies in epidemiology upon completion of their MS degree.

## Curriculum

### Courses Required

|              |   |   |
|--------------|---|---|
| PB HLTH 250B | Epidemiologic Methods II  | 4 |
|              | or PBHLTH W2Course Not Available  |   |
| PB HLTH 241  | Intermediate Biostatistics for Public Health  | 4 |
|              | or PBHLTH W2Course Not Available  |   |
| PB HLTH 245  | Introduction to Multivariate Statistics   | 4 |
| PB HLTH 252  | Epidemiological Analysis  | 4 |
|              | or PBHLTH W2Course Not Available  |   |
| PB HLTH 292  | Seminars for M.P.H. Students <sup>To be taken in first, third and fourth semesters.</sup> | 2 |

### Recommended Electives

|               |   |     |
|---------------|---|-----|
| PB HLTH C242C | Longitudinal Data Analysis                      | 4   |
| PB HLTH 250C  | Advanced Epidemiologic Methods                  | 3   |
| PB HLTH 251D  | Applied Epidemiology Using R                    | 2   |
| PB HLTH 252B  | Infectious Disease Modeling                     | 2-4 |
| PB HLTH 252C  | Intervention Trial Design                       | 2   |
| PB HLTH 253B  | Epidemiology and Control of Infectious Diseases | 3   |
| PB HLTH 255A  | Social Epidemiology                             | 4   |
| PB HLTH 255D  | Methods in Social Epidemiology                  | 2   |

|              |  |   |
|--------------|--|---|
| PB HLTH C256 | Human Genome, Environment and Public Health                              | 4 |
| PB HLTH 257  | Outbreak Investigation   | 2 |
| PB HLTH 258  | Cancer Epidemiology  | 3 |
| PB HLTH 271K | Introduction to Data Management and Programming in SAS for Public Health | 2 |

## Internship/Field Work/Practicum

Students in the Epidemiology MS program are encouraged to complete an internship for 12 weeks during the summer in between their two academic years. This fieldwork opportunity is discussed in the fall seminar for first-year epidemiology/biostatistics students (PB HLTH 292). Students who need assistance finding field placements are connected to the Center for Public Health Practice and Leadership (CPHPL). The CPHPL connects students with a wide range of public health organizations and research institutions based on their professional development goals. Many sites are based in the Bay Area but students also intern with organizations in other parts of the US and globally.

## Teaching/Research

Epidemiology MS students often serve as Graduate Student Instructors (GSI) or Graduate Student Researchers (GSR). GSI positions for their first year of study are usually for undergraduate courses, either in the School of Public Health or in other departments that match the expertise and educational background of the student. GSR positions are secured by contacting individual faculty with research opportunities that align with their interests and experience.

## CITI Protocol Course Certifications

All students who plan to engage in human subjects research must first complete and pass the appropriate Collaborative IRB Training Initiative (CITI) web-based education program modules. They can then be certified to serve as a lead investigator or as key personnel on any UCB human subjects research project.

## Advancement to Candidacy

MS students advance to candidacy at the beginning of their last semester in the program. Students should be in contact with their Program Managers to make sure they are on track to graduate.

## Capstone/Comprehensive Exam (Plan II)

In the final semester of the program, students present and defend a Master's paper. Examples of past papers include a critical literature review of an epidemiologic topic, a formal meta-analysis, a description of the results of current related research, and a detailed research proposal for a future study. In the proceeding semester, students are assigned to a faculty member with expertise in the student's area of interest to help guide the planning and writing of the Master's paper. Written papers are submitted early in the final semester. For the oral defense presentation (comprehensive exam), students present the findings of their paper to two or more faculty members and are expected to demonstrate competence in epidemiologic and biostatistical methods. Students are immediately notified of the outcome of their written and oral submissions. In the event of an unsatisfactory outcome, students are provided with feedback and given a chance to resubmit. Students who do not pass the resubmission are not eligible to received the Master's degree.

## The Dissertation Writer's Room

An additional resource for students working on dissertations is the Dissertation Writer's Room, a space dedicated to doctoral students advanced to candidacy, in Room 215 of the Doe Library. The room

provides a dedicated space encouraging focus and concentration on your writing in the quiet company of fellow doctoral candidates from humanities and social science disciplines. Located at the rear of Graduate Services (208 Doe), the Dissertation Writer's Room hours are Monday through Thursday, 9 to 9 p.m.; Friday, 9 to 5 p.m.; and Sunday, 1 to 9 p.m. You must sign up beforehand and show your UCB ID card when you enter 208 Doe, as the Doe Library's Graduate Services is reserved for the exclusive use of UCB graduate students, faculty, and staff.

The Dissertation Writer's Room accommodates six students using the study tables and two using the reading chairs. As utilization increases, this will be expanded. Wireless Internet connections are available via AirBears. Doe's Graduate Services section is a study space for all graduate students, housing around 25,000 volumes and a reserve library for graduate courses in the humanities and social sciences.

The core collection comprises standard editions of core texts, works of major theorists, titles on master's exams reading lists, and other materials heavily used by graduate students in the humanities and social sciences. Graduate Services also houses the Modern Authors Collection (XMAC), comprising the works of major 20th century English, American, and Anglophone literary authors, and a small collection of English and foreign language dictionaries. In addition to the study spaces in Graduate Services, study carrels in the Gardner (main) Stacks can be reserved by graduate students. Graduate students may apply at the Doe Circulation Desk for these carrels, and books from the Gardner Stacks may be charged out and kept in the carrels.

Students are expected to present some portion of their dissertation research at a national epidemiology meeting. Contingent on the availability of funds, students whose abstracts have been selected for presentation at a national epidemiology meeting may be eligible for the Spring Block Grant Supplement which provides aid for presentations during the summer months. Additionally, there is a Travel Grant award also administered by the Graduate Division which provides funding for those presenting at a national/international meeting/conference. Students will be eligible to receive this award no more than two times in their academic career, in order to provide funding to as many students as possible.

Many students choose to work part-time to supplement their income while they are in school. It is generally not recommended for graduate students to work in their first semester due to the stressful nature of adjusting to the rigorous graduate program at SPH. However, if you choose to work, and are eligible, there are a few resources to help you find employment opportunities. Access our SPH job site via the Center for Public Health Practice's website (<http://sph.berkeley.edu/careers/center-public-health-practice/>).

Students may also register for Handshake (<https://career.berkeley.edu/handshake/>).