

# Epidemiology

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 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.

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 comes 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 (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 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. *If the applicant is admitted*, then *official* transcripts of all college-level work will be required. Official transcripts must be in sealed envelopes as issued by the school(s) attended. If you have attended Berkeley, upload your unofficial transcript with your application for the departmental initial review. *If you are admitted*, an official transcript with evidence of degree conferral *will not* be required.
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, not the Graduate Division.
3. **Evidence of English language proficiency:** All applicants from countries or political entities in which the official language is not English are required to submit official evidence of English language proficiency. This applies to applicants 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.

If applicants have previously been denied admission to Berkeley on the basis of their English language proficiency, they must submit new test scores that meet the current minimum from one of the standardized tests.

## Where to Apply

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

## Admission to the Program

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: Biological, social, or mathematical sciences

Common work experience for admitted applicants: Work experience in a public health setting

The amount of coursework necessary for each doctoral student in the PhD program varies greatly, depending on previous coursework, experience, and background. 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 epidemiologic research.

For admissions application and more detailed information about the School of Public Health, including courses, degree requirements, fees, and financial aid, and various admissions events, please see the admissions page on the School of Public Health's website (<http://sph.berkeley.edu/students/admissions>) .

## 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 such as social epi, nutritional epi, or infectious diseases.

#### 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 are 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. In most instances, the detailed written prospectus will be a suitably revised and updated version of the prospectus submitted prior to taking the oral qualifying examination.

Total normative time in advancement is three years.

### Total Normative Time: Five Years

### Time to Advancement

#### 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 Independent Research series courses are not counted in this calculation.)

#### Courses Required

PB HLTH 250B	Epidemiologic Methods II <sup>1</sup>	4
PB HLTH 250C	Advanced Epidemiologic Methods	4
PB HLTH 293	Doctoral Seminar	1-4
PB HLTH 252D	Introduction to Causal Inference	4

PB HLTH 299	Independent Research	1-12
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Grad Electives in PB HLTH 255-258 series per approved study list in 2 major areas (epidemiology & biostatistics)

Grad Electives per approved study list re third area of emphasis

PB HLTH 375B	Instructional Techniques in Biostatistics	2
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<sup>1</sup> PB HLTH 250B Epidemiologic Methods II recommended if student has no previous advanced coursework in epidemiology.

In addition, students are expected to develop expertise in a third area, which is 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 prepare a formal application for the qualifying examination to Graduate Division (Appendix B). This application must be approved by the head of the graduate group in epidemiology (Professor A. Reingold, 104 Haviland Hall) and must be submitted to the epidemiology student affairs officer (Janene Martinez, Room 113 Haviland Hall) for submission to the Graduate Division. Only the student affairs officer can submit the application to the Graduate Division. 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 form and a copy of the student's CITI certification) to the division's student affairs officer, Janene Martinez (Room 113 Haviland Hall). 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 for the PhD degree is of limited duration. When a student is advanced to candidacy, the Graduate Division informs him or her of the number of semesters he or she is eligible to be a candidate, based on time in candidacy, or normative time. 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 prospectus, the student is expected to demonstrate convincingly that he/she possesses the following skills: conceptual, problem solving, critical/creative, and writing. Following submission of the prospectus to the epidemiology student affairs officer, copies will be distributed to the members of the qualifying examination committee at least three weeks before the scheduled date of the qualifying examination. Committee members will have read the prospectus before the qualifying examination and are expected to provide the student with specific written

## 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. Students are encouraged strongly to have a schedule of regular meetings with the dissertation chair.

## Dissertation Presentation/Finishing Talk

The purpose of the qualifying examination is to assess the adequacy of a student's preparation to conduct dissertation research in epidemiology. All epidemiology PhD students will be examined and be required to demonstrate competence in epidemiology, biostatistics, and a third area of the student's choosing. The third area is typically chosen so as to be relevant to the student's proposed dissertation research. While all epidemiology PhD students will have prepared a prospectus in the form of a detailed research proposal that has been read by the faculty comprising the qualifying examination committee, the qualifying examination is not intended to be solely a defense of that prospectus. The qualifying examination is intended to assess the breadth and depth of the student's knowledge with regard to the history, theory, concepts, and real world application of epidemiology, biostatistics, and the specified third area. Materials are provided to students that explain the structure of the examination and a listing of areas of theory, practice and subject matter that are the domain for the examination. A student, who fails the qualifying examination, as well as his /her faculty adviser, will be informed about the area(s) of deficiency that led to the failure. A student may re-take the qualifying examination once; any student who fails the qualifying examination a second time may not advance to candidacy or remain in the doctoral program.

## Required Professional Development Presentations

Doctoral students are expected to present their research plans and progress/results in the epidemiology doctoral seminar PB HLTH 293 beginning in the first semester of year one and subsequently each semester until the completion of the second year. There is no requirement for a formal thesis defense. However, students are

encouraged to present their work during the semester in which they plan to file the dissertation. Two venues are available: PB HLTH 293 and the Epidemiology Research Seminar Series.

## 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 (<http://guide.berkeley.edu/graduate/degree-programs/epidemiology/%20http://gsi.berkeley.edu>) .

## 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. Information regarding residency for tuition purposes can be found at here (<http://registrar.berkeley.edu/Residency/legalinfo.html>) . Questions regarding residency should be directed to the Residence Affairs Unit at [ores@berkeley.edu](mailto:ores@berkeley.edu) or 510-642-5990.

## Unit requirements

MS students in epidemiology are under Graduate Division Plan II, which requires a minimum of 48 units and an oral comprehensive examination. 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
PB HLTH 145	Statistical Analysis of Continuous Outcome Data	4
PB HLTH 241	Statistical Analysis of Categorical Data	4
PB HLTH 292	Seminars for M.P.H. Students	1-4

PB HLTH 292.7 (seminar for 1st yr MS students) should be taken during the first semester.

PB HLTH 292.1 (master's paper seminar) should be taken during the last semester.

### Recommended Courses

PB HLTH 142	Introduction to Probability and Statistics in Biology and Public Health (Should be taken if student has no prior statistics coursework.)	4
PB HLTH 245	Introduction to Multivariate Statistics	4
PB HLTH 250A	Epidemiologic Methods I (Should be taken if student has no prior epidemiology coursework.)	3

PB HLTH 251C Causal Inference and Meta-Analysis in Epidemiology

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PB HLTH 292.3 (Epi Seminar for 2nd yr students) is recommended, depending on the type of master's paper written. Should be taken during third semester.

PB HLTH Grad Electives per approved study list based on student preparation and choice of third field outside of epidemiology & biostatistics.

## Internship/Field Work/Practicum

Students in the Epidemiology MS Program are highly encouraged to complete an internship for a minimum of 12 weeks as part of their master's program. This fieldwork requirement will be discussed in the fall seminar for first-year epidemiology/biostatistics students (PB HLTH 292). There is also usually a joint social event organized by the second year students, sometime late in fall semester, where the continuing students provide background on their own field experiences for the entering students' benefit. Students who need help finding field placements and mentors will be assisted by the Center for Public Health Practice, which oversees many fieldwork sites in the Bay Area. Internship sites are chosen from a wide range of public health organizations and research institutions and are selected based on the student's objectives for professional development and the needs of the organization. Many sites are local, but students may also intern in other parts of the country or the world.

## Teaching/Pedagogy

Though anyone should consider carefully whether they should work in their first year of graduate study, students may seek a position as a GSI for undergraduate courses, as an MS student, or as a GSR (graduate student researcher) working for a research center or specific faculty member(s). Students interested in finding a GSR position, may contact individual faculty with research that aligns with their interests/experience. They are not limited to GSI/GSR positions within SPH, but would need to contact other departments in which they have expertise for availability, qualifications and departmental deadlines. Hiring is managed by the department in which each position is located.

## 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

All students enrolled in the MS degree program in Epidemiology are required to check in with their student services adviser to make sure that they meet the requirements to advancement to candidacy during their third semester detailing their required courses, electives, and seminar. All students meeting requirements will be advanced. They will receive confirmation from the Graduate Division.

## Capstone/Comprehensive Exam (Plan II)

During the spring semester preceding graduation, students in the MS program must present and defend an in-depth paper on an epidemiologic topic that is handed in early in the spring semester. The paper can take the form of a critical review of the existing epidemiologic literature about a particular topic; a formal meta-analysis; a paper describing the results of an original epidemiologic study by the student; or a detailed

research proposal for an epidemiologic study. In the fall semester before the paper is due, each student will be assigned to a faculty member with expertise in the subject matter of the student's proposed paper. The student will work with and receive ongoing input from that faculty member during the various stages of planning and writing the paper. (Details concerning the paper topic, format, due dates for various stages of development of the paper are in the Epidemiology Masters Paper Guidelines.) In the spring semester, each student will give a brief oral presentation concerning his or her paper on a pre-assigned date and will then be examined orally by two or more faculty. Specifically, in this oral comprehensive examination, the student will be expected to defend his or her written paper and, in the process, demonstrate competence in and a firm grasp of epidemiologic and biostatistical methods and approaches relevant to studies of disease causation and prevention. Decisions on the outcome of the comprehensive examination will be given to the student the day of the examination as satisfactory or unsatisfactory. In the event of an unsatisfactory outcome, a written and/or oral re-examination is the usual recommended course of action. Students who do not pass the re-examination are not eligible to receive 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.

## Sheldon Margen Public Health Library

The Public Health Library's services and collections support primarily the School of Public Health and its research units. Its collection is particularly strong in all areas of public health, nutrition in health and disease, health administration, epidemiology, toxicology, occupational health, maternal and child health, biostatistics, communicable diseases, community health and environmental health. The library (<http://www.lib.berkeley.edu/libraries/public-health-library>) also collects in the area of international health.



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 summer grant program for doctoral students governed by the Graduate Division. The award provides a \$3,500 stipend and fees for three Summer Session units. 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 CalJobs through Callisto (<https://career.berkeley.edu/Callisto/CalJobs.stm>) .